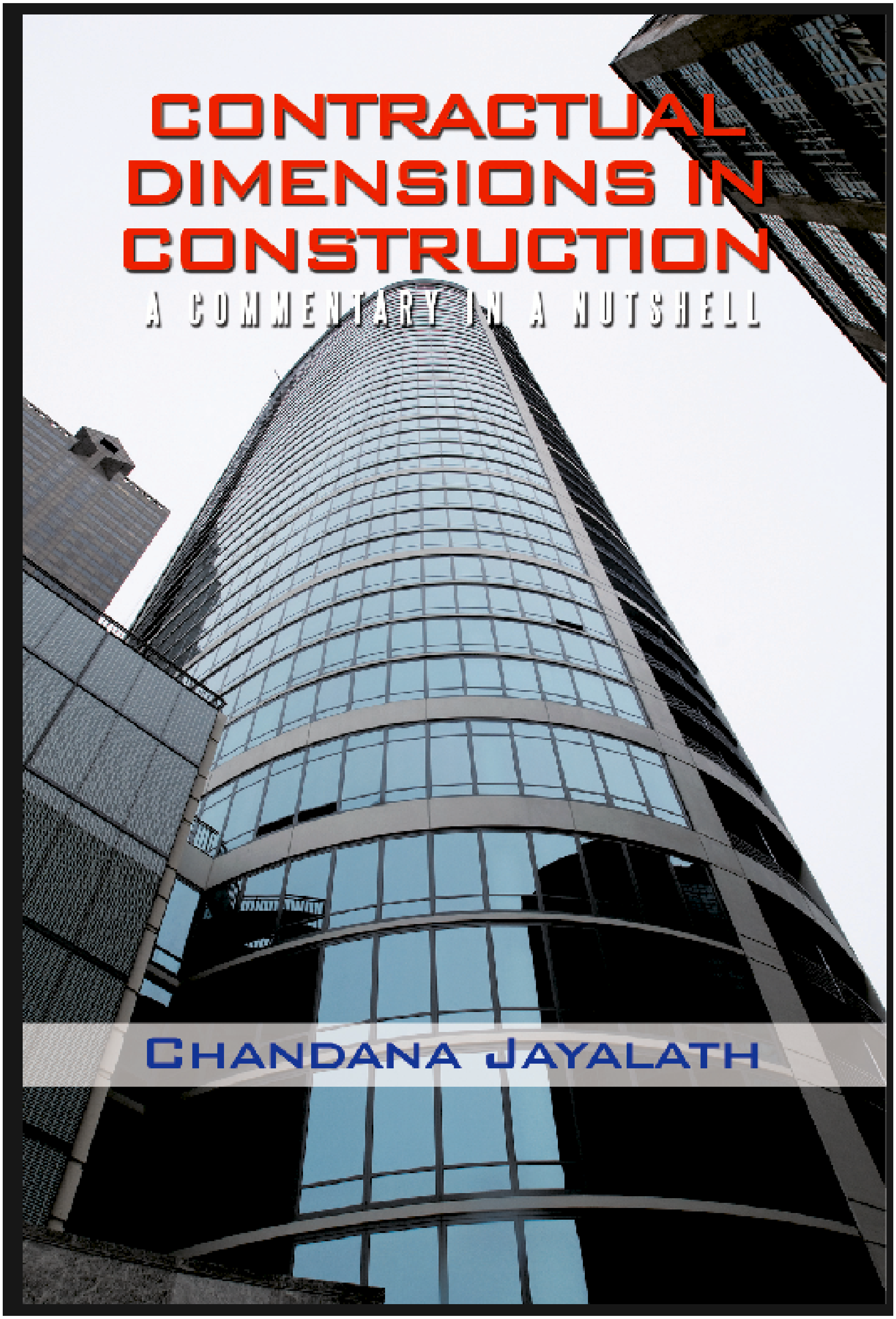

CONTRACTUAL DIMENSIONS IN CONSTRUCTION

A COMMENTARY IN A NUTSHELL

CHANDANA JAYALATH

Contractual Dimensions in Construction

A Commentary in a Nutshell

Chandana Jayalath

D.Sc, M.Sc, PG Dip (CM), PG Dip (IM), B.Sc (QS) Hons,
FRICS, MCIArb, FIQS (SL)

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A Commentary in a Nutshell

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To my life - Sriyani Pushpalatha and Asha Manohari Jayalath

PRECLUDE

It is with immense pride and pleasure I write this note on the author Dr. Chandana Jayalath. Dr. Jayalath is known to me well over 20 years and his academic and professional qualifications show the calibre of the author and his enthusiasm to share with his fellow peers as well as with the international construction community his knowledge gained in his carrier. This book is one of his many such works published both with well known publishers as well as in the World Wide Web.

His academic achievements to name a few are a Doctor of Science in Management of Engineering and Technology with a 'Cum Laude' honorary distinction from Southern California University in 2007, a Master of Science in Project Management (2001) from University of Moratuwa, a Post Graduate Diploma in Construction Management (1999) from Open University of Sri Lanka and a Post Graduate Diploma in International Mediation (2009) from University of London and a Bachelor of Science Honors degree in Quantity Surveying (1992) from University of Moratuwa.

He has gained memberships in many institutions such as being a Member of the Chartered Institute of Arbitrators, UK (2009), Fellow of the Royal Institution of Chartered Surveyors, UK (2004), Member of the Australian Institute of Quantity Surveyors (2000) and a Member of the Institute of Quantity Surveyors, Sri Lanka (1995). He currently works in the Gulf region as a Claims and Contracts Specialist.

This book will be of immense help good material to students and practitioners in the construction sector.

PROF CHITRA WEDDIKKARA

Professor of Building Economics
President of Institute Of Quantity Surveyors, Sri Lanka
Regional President of Commonwealth Association of Surveyors & Land Economists
Chartered Architect and Chartered Quantity Surveyor

PREFACE

An idea of a book written on the principles of construction contracts has been etched in my mind since a long time as a result of debates spent long hours in subtlety. The international nature lies in both the facts that the parties come from different industrial backgrounds and so at variance are the approaches, strategies and defences to a given issue. The forms of contract, both standard and hybrid, to administer commercial and contractual relationships also differ upon the party for whom the work is being carried out and is why so imperative for the parties to understand the generality of contractual provisions and the variety of broad interpretation that exists.

However, disputes occur when parties fail to leave from their extreme positions, apparently because of the attempt to find solutions within hard bound copies of the contract documents forgetting the fact that contracts are not 'watertight' in every respect. The reality is that contracts do not operate in a vacuum; instead they are a system of interrelated functions.

Construction projects are unique and heterogeneous and the eternal theme appears to be the inability to apply the same principle in all cases. As a result, the same issues are not uncommon to arise under different circumstances such that they need to be evaluated on their own merits. These issues, if not dealt with promptly, often tend to get accumulated and inextricably intertwined with complications eventually turning into global claims pending 'last minute' settlement at the contract close-out.

However, the topicality of claims has been accentuated by the fact that in some cases Contractors have been in the pursuit of claims even before they mobilise at site while Employers in general take defensive actions lately. It is also a fact that claims usually evolve when a project is nearing completion. There has been an increase in the amounts, frequency and the diversity of circumstances in which claims are made over the past few years and these claims cause an imbalance in the total project delivery within time, cost and quality parameters. Suspension of projects as a whole, open market price increase, fluctuation in foreign currency exchange rates and various financial claims are a couple of examples due to recent economic crisis.

As a means of avoiding and/or resolving disputes, construction contracts have been promoting the concept of multi-tiered dispute resolution because of inherent advantages attached with the process at many distinct and escalating stages of a dispute. Techniques which are commonly incorporated into multi-tiered dispute resolution clauses include negotiation, adjudication, mediation, dispute boards, and arbitration and finally the Courts as the tiers escalate.

While this book adequately covers various aspects in relation to interpretation rules, contract and pricing modalities, payment terms, the duties, rights and obligations of the parties etc, it further goes onto explain the issues in connection with commencement, completion, extension, maintenance and liquidated damages, with the case law in support. Also, a substantial effort has been placed in order to highlight the limitations and hypothesis underlying the application of various methods of determining the eligibility and quantum of excusable and compensable components in a claim, with practical examples where appropriate. FIDIC, being an internationally acclimatized standard form which has provided basis for many other locally adopted forms worldwide, and more over the reason of nucleus for several hundreds of bespoken contracts, the tendency to refer to such clauses has been inevitable in this book. For the purpose of discussion, the term Employer can be taken similar to the terms Owner, Client, Principal or Developer, as the case may be.

Accordingly, I hope this text might help demystify grey areas in many of the commercial and contractual issues that are encountered in day to day practice as claims and contracts specialists, commercial managers, forensic delay analysts, quantity surveyors and cost engineers. Equally, this book will be a good reference material for students at universities studying civil engineering, architecture, construction law and management, quantity surveying and other related disciplines.

Chandana Jayalath
2/43, Katana Rd, Mirigama
Sri Lanka
2 October 2010

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It was far back in 2001 I started work with Kevin Norman Bailey, MRICS while in Oman. I am happy to offer him an absolute credit of this outcome as a result of his arguments that made me think differently.

Meanwhile, let me thank Haris Deen, PhD, the Special Advisor to HE the President, Public Works Authority, Qatar, Mrs. Chitra Weddikkara, Professor in Building Economics, University of Moratuwa, Vasantha Abeysekera, Assistant Professor in Construction Management, Auckland University of Technology, Jeff Higgins, FRICS, Partner of Gardiner & Theobald International, and Roger Bennett, FRICS, formerly a Commercial Manager, Balfour Beatty Construction, UK for their guidance in reviewing the final drafts of the book.

I also like to acknowledge the IT support given by Sajith Ranaweera and Manjula Jayawardane, who are B.Sc graduates in QS.

While not detracting any way from acknowledgements, I should make clear that the opinions and interpretations are my own, as are any errors or omissions, except where references have been duly quoted in the text.

ABBREVIATIONS

AAA	American Arbitration Association
ADR	Alternative Dispute Resolution
ASTM	American Society for Testing and Materials
B/Q	Bill of Quantities
BOOT	Build Own Operate and Transfer
BS	British Standard
CPM	Critical Path Method
CPR	Civil Procedure Rules
DAB	Dispute Adjudication Board
DBO	Design Build and Operate
DRB	Dispute Review Board
EOT	Extension of Time
EPC	Engineering Procurement and Construction
FIDIC	International Federation of Consulting Engineers
FTC	Final Target Cost
G-Max	Guaranteed Maximum Price
HOOH	Head Office Overhead
HVAC	Heating, Ventilation and Air Conditioning
IATA	International Air Transportation Association
ICC	International Chamber of Commerce
ICE	Institution of Civil Engineers, UK
JCT	Joint Contract Tribunal
KSF	Key Success Factors
LCC	Life Cycle Costing
LCIA	London Court of International Arbitration
LD	Liquidated Damages
MC	Management Contracting
MOU	Memorandum of Understanding
NSC	Nominated Sub Contract/Contractor
O&M	Operations and Maintenance
PBC	Performance Based Contracting
PERT	Project Evaluation Review Technique
QS	Quantity Surveyor

RIBA	Royal Institute of British Architects
ROW	Right of Way
SCL	Society of Construction Law
SMM	Standard Method of Measurement
TIA	Time Impact Analysis
UNCITRAL	United Nations Commission on Trading Law
VE	Value Engineering

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CHAPTER 1
CONTRACT FORMATION, EXISTENCE AND INVALIDATION

1.1 Introduction

Construction contracts do not differ fundamentally in nature from other types of contracts. However the obligations of performance in construction contracts may have been imposed on the parties over a long period of time whereas sales contracts for instance, by comparison, could be performed instantaneously. Of course, some construction contracts also involve aspects of sales contracts, for example in direct supply and installation of a hoist. Basically, construction contracts involve not only Contractors and Employers but also consultants from different disciplines, sub Contractors, investors, insurers, bankers, and so on.

On account of the higher number of participants, there will be correspondingly a higher number of contract agreements in effect, concurrently operating in a site. Such contracts would bind the parties for instance, the Employer and the project's funding agencies, the Employer and the Main Contractor, the Employer and the Consulting Engineer, the main Contractor and his sub-Contractors or suppliers, the Main Contractor and nominated sub Contractors, as well as the Employer and the Principle Architect and his specialist sub-consultants. A greater number of participants results in fragmentation of responsibilities in the supply chain. As it invariably involves parties having different requirements, perceptions, goals and strategies, the tendency is always to have interests in conflict. Despite its peculiar nature of several parties forming multiple contracts in a construction project, the privity of contract is only between two parties and only those parties have the *locus standi* in a law suit.

1.2 What is a contract by definition?

A contract is an agreement enforceable in law. This definition is satisfied when a couple of elements are present in a contract. There must be an agreement, with an intention to create legal relationship, made in a particular form, in consideration of their mutual commercial interests. A contract which does not comply with the above requirements may be void, voidable or unenforceable. An agreement is reached when one person makes an offer which is accepted by the other. When offer and acceptance correspond in every respect, there is agreement between the parties. There must be at least two parties to an agreement, which is usually in writing as far as the construction contracts are concerned. Any discussion onto formation of a contract therefore starts with the term 'offer'.

1.3 A valid offer

An offer is an expression of willingness to contract on certain terms made with the intention that the offer shall become binding as soon as it is accepted by the person to whom it is addressed. A valid offer must have several requirements.

An offer must be definite. It must not be framed vaguely but be seriously intended. An offer could be made to a particular person, a group of persons or to the world at large. In the early English case of *Carlill Smoke Ball*[1], a company which sold smoke balls offered a reward of 100 pounds to anyone who contracted influenza after using their smoke balls as prescribed. The plaintiff did so but succumbed to influenza. It was held that the company was bound to pay and that they could not argue that an offer could not be made to the world at large.

An offer must be distinguished from an invitation to treat. An invitation to treat could be a display of price-marked goods in shop windows or on shelves of a shop by a shopkeeper or an auctioneer's request for bids. It was held in a court case[2] that it is the customer who selects goods from the shelves of a self service store who makes the offer, which may be accepted by the seller when the goods are brought to the cash desk. An invitation by a company to the public to subscribe for shares in that company is also an invitation in public to make offers. A tender notice in construction is an invitation to make an offer and does not amount to an offer. It is the reply that constitutes the offer when the tenderer submits his tender in a sealed envelop.

---

[1] Carlill v. Carbolic Smoke Ball Co. (1893) Q.B. 256 (C.A.)

Hence, construction contracts are generally made by a process of offer and acceptance, both of which are in writing. A Contractor makes an offer to a client to carry out the works as set out by the tender documents issued to him. When such a tender is completed and submitted by the Contractor and the client accepts it, a contract is formed, the point at which the client becomes the Employer. It should be noted that for such a contract to form, the acceptance should be unconditional. When completed tender forms are submitted there are often tender qualifications attached to them so that the offer is not made strictly in accordance with the tender conditions. Any subsequent alterations to the tender, once accepted, shall bind the parties under contract.

An offer can be terminated in several ways. An offer could be revoked by the offeror at any time before it is accepted by the offeree as long as such revocation of the offer has been communicated to the offeree. In the case of *Byrne*[3] in Cardiff, A offered to sell goods to B in New York by letter of October 1. B who received the offer on the 11th, immediately telegraphed his acceptance. On the 8th, A wrote revoking the offer and B received this letter on the 20th. Court held that the revocation was ineffective because before it reached the offeree, the latter had already accepted the offer and a valid contract had formed.

A revocation of an offer needs no communication by the offeree; it is enough if the offeree knows from a reliable source that the offer has been withdrawn. This rule was established in the case of *Dickinson*

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[2] Pharmaceutical Society of Great Britain vs Boots Cash Chemists (Southern) Ltd, 1953, 1 QB 401

[3] Byrne v Van Tienhoven [1880] 5 CPD 344

v Dodds[4] where the Court held that an offer to sell land could not be accepted after the offeror had to the offeree's knowledge decided to sell the land to a third party. The court stated that since Dickinson knew that Dodd's offer had been implicitly withdrawn when he learned that he had sold the property to someone else, there was no meeting of the minds at the time acceptance was made and therefore a binding contract was not formed. This rule puts the offeree possibly in a difficult position of deciding whether his source of information is reliable.

An offer could be terminated by the rejection of the offeree. A rejection of an offer can be expressly made or it can be implied from conduct. In certain situations the offeror is justified in inferring that the offeree intends not to accept the offer. For example an attempt made to accept an offer on new terms, not contained in the offer, is indeed a rejection of the offer and becomes a counter offer.

An offer could also be terminated by the lapse of time. Parties to a contract could agree to keep an offer open for a certain period and if it is not accepted during that time, the offer lapses. If no time is fixed for keeping the offer open, the offer lapses after a reasonable period of time. The Courts, in determining what a reasonable period is, examine the facts of each case in detail. Death or insanity of one of the parties to the contract also results in the termination of the offer.

1.4 What constitutes acceptance

Acceptance is the final and unqualified expression of assert to the terms of the offer. Until an offer is accepted it has no legal effect; but once it is accepted it ripens into a contract which is irrevocable. Acceptance must be by the offeree, unless it can be shown that the offer was not restricted to the offeree e.g, in the instance of a general offer. A valid acceptance must have several requirements.

An acceptance cannot be a counter offer. In the case of *Hyde v Wrench*[5], A offered to sell his farm for 1000 pounds to B, but B offered 950 pounds which A refused to accept. Later B agreed to give 1000 pounds but A refused to sell. It was held that since B had rejected the original offer of A, a valid contract did not come into effect by B's later acceptance of the rejected offer.

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[4] Dickinson v. Dodds, 2 Ch. D. 463 (1876).

[5] Hyde v Wrench [1840] 3 Bea 334

An acceptance with some variation or addition of terms would be invalid. For example, a person offering to buy goods from another could place an order for the goods on a form specifying his standard conditions of trade. The seller could accept the offer by writing to the buyer on a form stipulating such conditions which differ materially from those of the buyer. In this situation the Courts have held that the seller's confirmation of the offer on his terms is capable of being accepted by the buyer and that a contract is formed as soon as the last of the forms is sent and received without objection being taken to it.

Acceptance must be communicated to the offeror, who may prescribe the method of communicating acceptance and also waive communication of acceptance and indicate that the acceptance by silence would suffice. However, the construction bid proposals take a different mode. Quite often, parties discuss the tender contents by considering optional offers accompanied with the original tender, which may be capable of nearing their competing interests. Parties sometimes agree on even new terms and withdraw qualifications attached with the tender. These principles would anyway apply only if acceptance could be legitimately presumed from silence.

Different rules apply to communication of acceptance. Whenever the parties are physically present (which includes telex and telephone communication because communication is instantaneous) the contract is concluded when the acceptance reaches the mind of the offeror. In a recent case an English company negotiated with an Austrian company for the purchase of a quantity of steel. A contract was said to have been made by an acceptance by telex from the English buyers and received by the Austrian sellers in Vienna. The contract was never performed. The buyers brought an action for breach of contract. The question was whether a writ could be served on the Austrian company. The Court could do so only if the contract was made in England. It was held that the telex from London was accepted in Vienna and therefore, caused the contract to be made in Vienna so that a writ could not be issued.

Where the communication of acceptance is by post or by telegram, the acceptance is completed when a letter is posted or a telegram handed in. In the case of *Adams v Lindsell*[6], an acceptance did not reach the offeror on the anticipated date due to the offer not being properly directed. The offeror assuming that the other party was not interested sold the goods to another. The Court held in favour of the offeree because the contract was concluded when the letter of acceptance was posted.

It is clear that the acceptance of the offer must be positive and unambiguous if it is to result in the conclusion of and signing a contract; and acceptance must be communicated in writing to the Contractor. However, acceptance may be either expressly in writing or impliedly by conduct in that both parties entering into a contract. For instance, the Employer giving the Contractor the possession of site and the Contractor executing the works will have proven evidence of their mutual consent even in absence of the acceptance in writing. However, there are cases, such as in the supply of materials, where acceptance in general terms will not create a binding contract until such time the actual orders are placed for distinct goods in definite quantities.

When the Employer accepts the Contractor's tender and acceptance is notified to the Contractor, the parties usually consider themselves bound, and works shall be commenced on that basis. However, when the circumstances are such that they are questionable in both ways, the Contractor's entitlement to payment for subsequent works may only be in terms of a quantum meruit settlement. This is when a formal contract is not forthcoming.

1.5 The doctrine of consideration

In law, consideration is a 'dual' carriageway. When spoken in legal jargon, consideration is either some detriment to the promisee (the person to whom the promise is made) in that he may give value or some benefit to the promisor (the person who makes the promise) in that he may receive value. Consideration has some value in a monetary sense distinguished from moral obligation. What the law requires is a valuable consideration which has been defined as 'some right, interest, profit or benefit accruing to one party or some forbearance, detriment, loss or responsibility, given, suffered or undertaken by the other'.

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[6] Adams v Lindsell [1818] EWHC KB J 59

For example, payment by a buyer is in consideration of the seller's promise to deliver and can be described as a detriment to the buyer or as a benefit to the seller; and conversely delivery by a seller is in consideration of the buyer's promise to pay and can be described either as a detriment to the seller or as a benefit to the buyer.

1.6 What intends in a letter of intent!

Usually, a letter of intent creates no contractual liability. It merely expresses an intention to enter into a contract in the future.

A good letter of intent establishes a degree of liability and the Employer's actual intent regarding a formal contract in future. An Engineer may only issue a letter of intent on the authority of the Employer. A letter of intent should comprise a definition of the Employer's commitment, for example whether he authorises the Contractor to place orders for materials, or fabrication, or to do work on site. It should carry a statement that the parties are not binding themselves to a contract, and that their rights and obligations under the letter of intent will end on a named date if no formal contract is made in the meantime. It should also specify the method of paying the Contractor for the orders placed or work done during the currency of the letter of intent and a provision that any materials brought to site are to pass into the immediate ownership of the Employer, with safeguards against retention of title clauses.

In the *British Steel* case[7], the Court had to determine whether a particular letter of intent originated a contract. The judge, Robert Goff, said: 'any contract that has come into existence must depend on a true construction of the relevant communications which have passed between the parties and the effect (if any) of their action pursuant to those communications. There can be no hard and fast rule whether a letter of intent will give rise to a binding agreement; everything depends on the circumstances of the particular case'. Goff further said that if work is done pursuant to a request contained in a letter of intent, it will not matter whether a contract did or did not come into existence because, if the party who has acted on the request is simply claiming payment, claim will usually be based on a *quantum meruit*.

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[7] British Steel Corpn v Cleveland Bridge and Engineering Co Ltd (1984) 1 All ER 504

As mentioned, a letter of intent outlines an intended agreement that without more should not form any contract between the parties. However, the function of a letter of intent may even go up to the extent of a commencement order, depending on what is written over there. In determining whether or not the letter of intent construed a binding contract, the primary test is the intention of the parties, to be gathered from the effect of the language used. Mere verbal formulas, if inconsistent with the real intention, will be taken aside. It does not matter by what name the parties chose to designate it, but the existence of a contract, meeting of the minds, intention to assume obligations, acts and inactions of the parties, and the circumstances whatsoever will altogether matter to disclose the intent.

1.7 Who owns the contract?

The *Tomlinson*[8] case is an important Court case to understand the after effects of taking an 'upper hand' in the contract. A property owner entered into a contract with a builder for the construction of an extension. A part of the works was not constructed in accordance with the instructions given. Before completion, the property owner's solicitors wrote to the builder alleging breach of conduct, stating that the builder has no permission to re-enter the property asserting that remedial works were to be undertaken on the property owner's terms. Proceedings were commenced by the property owner for return of the interim payments and damages for defective work.

The Court held that the letter from the Employer's solicitor amounted to a notification that the Employer considered the contract as already been ended. This was a repudiatory breach of the contract by the Employer herself and the builder was entitled to damages. Although the Employer never expressly stated that she was treating the contract at an end she was deemed to have done so by her conduct. Subsequent communications that are hostile in nature aiming to prevent existing rights may be sufficient enough to convey an intention no longer to be bound by the contract, even if this is not the true intention, particularly if the other party is not in serious breach of the contract itself. The whole lesson is that it is the contract to decide destiny of the parties.

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[8] Margaret Tomlinson v Iain Wilson [2007] (QBD)

1.8 Corners of a contract

Although it is not always, a five step procedure has been involved in the formation of a typical construction contract, starting with the letter of intent, through the subsequent letter of acceptance, letter of award, Engineer's order to commence to the formal signing of the contract agreement. Due to fast track nature of construction projects, the first four steps may be skipped in a single letter of intent that is reliable enough for the Contractor to mobilise his resources. What is important is therefore the substance expressly given in writing rather than the mere title of the letter. However, the danger is when the parties change their minds with many interim correspondences in between the issue of letter of intent and the signing of the contract. The final understanding, however, must be reflected in clear terms in a memorandum of understanding although an award of a contract does not necessarily take a particular manner.

Any standard form of contract is a generic product applicable under 'typical' circumstances subject to amendments in the Particular Application section in order to cater locally specific project requirements where necessary. Importantly, the Contractors should recognize the differences and know how to act upon those amendments in the contract. All in all, everyone 'knows the deal' if presented with a standard form. Another significant advantage is that the wording of many standard forms has been subject to interpretation over many years by Courts and various tribunals. But at least with standard forms, both Employers and Contractors know roughly where they are standing. However, on most occasions what the standard form gives with one hand the amendments take back with the other. In many countries, contracts in construction are largely bespoken by nature.

Many standard forms aim to provide a coverage of the term called 'Contract' by designating a list of documents. This list usually includes the signed Contract Agreement, the Letter of Acceptance, the Letter of Tender, General and Particular Conditions, the Specifications, the Drawings, the Schedules, and the further documents (if any) which are listed in the Contract Agreement. Each document has its own function. Conditions of contract spell out rights and obligations of the parties whilst specifications prescribe the level of quality, workmanship and performance. Drawings show what is to be done and the bill of quantities show how the tender price has been dispersed along with the major cost significant items.

It is however imprudent to purposely limit one's scope, right or obligation within the above list. It could be eventually referred all the way from contract document to standard customs of the building trade. In between these two extremes, parties get codes of practice, manuals and technical catalogues, manufacturer's instructions etc that might hinge upon one's duty, right or obligation. These codes of practice for instance fill gaps in areas of custom and usage that no standard form of contract would ever do. The extent of contract would therefore mean what have been specified in the contract as well as reasonably inferred from the contract.

For example, where structural steel work is required, the tendency is to expressly refer to BS, ASTM or any other national code on structural steel work. It has to be either expressly referred to in the specification, or if not expressly included, that there would be an implied term that all work conform to that code on statutory reasons or simply because the industrial recognition since a long time. Where particular codes are expressly referred to in the specification, one could infer that other codes, not expressly included, do not need to be complied with. The likelihood is, however, that in the absence of expressly excluding an obligation to comply with any particular code, a Court would interpret any contract as to include an implied term, at least, that codes, were relevant, were to be complied with.

Similarly, a standard method of measurement (SMM) may define the extent of a contract. SMM provides a uniform basis of measurement for both proposed and completed works thus avoiding idiosyncrasies of individual measurers. The essence of efficient measurement of construction works is to define those items of work which are to be measured, the extent to which they are to be described and quantified and to identify those items which are deemed to be included within the measured items. The adjudgment of measurement required, for the clarification and general benefit of all interested parties, is usually established through the application of a pre determined standard method of measurement.

In all, construction contracts are a means of allocation of project risks via various parts of the documents that are complimentary each other, unless the order of precedence is given. These documents altogether apportion the risks.

1.9 Pricing errors

The Contractor is responsible for any error made in computing the tender, which shall not be corrected in calculating the contract value as per the majority of tender procedural guidelines. The sum stated in the form of tender remains binding unless otherwise expressly stated in the tender documents.

Arithmetical errors including adding and transferring mistakes, except of course typographical errors are usually corrected as stated in the Instructions to Tenderers. Quantities arbitrarily changed by tenderers are considered to be a tender violation. The cost on unpriced items with the usual notes such as 'included', 'excluded', 'nil', 'not applicable' etc are deemed to be included elsewhere within the tender price, unless the intention is expressly made otherwise. Once clearly given the pricing preambles, the Contractor can in no way rebut this presumption.

The priced bill of quantities will be examined prior to signing of the contract in order to ascertain that the items are moneyed out correctly at the rates quoted. Should any inconsistencies in pricing or errors in moneying out be found, the extended amounts will be corrected in some cases. The tender sum as stated in the form of tender shall remain unaltered. An endorsement added to the priced bill indicating that all rates and prices excluding preliminary items, contingencies, prime cost sums, provisional sums by the tenderer are to be considered as reduced or increased in the same proportion as the corrected total of priced items exceeds or falls short of the tender sum. Both parties to the contract shall sign this endorsement. A question is whether the overall correction is equally applicable to post contract variations. It is apparent in some projects the Employers prefer to entertain the benefit of Contractor's pricing mistakes, the result of which brings down the tendered sum by a considerable proportion, using a correction factor for the whole of works carried out including variations. However, some tender rules direct the parties to apply the correction factor to the extent of the existing billed quantities only.

There exists no contractual restraint however for the parties to arrive at an amicable solution even after entering into the contract if both parties' wish is to avoid embarrassing over the unrealistic pricing at the tender. The ideal stage to make any revision on the rates is well before the contract is formalised. For instance, any front loading, possibly reflected in a perato curve analysis, could be adjusted on the consent of both parties prior to establish contract rates. Again, should any inconsistencies in pricing be found, the unit rates and extended amounts can be adjusted using the most appropriate or negotiated rates, which will be shown in a separate endorsement.

A main Contractor if he discovers an error in the sub-Contractor's tender cannot accept the tender so as to create a contract where the mistake is as to the terms of the offer itself. In the case of *McMaster University*[9], an Employer sought to accept a tender from a Contractor knowing that the Contractor had omitted the entire first page of the tender which included the 'fluctuation' clause. The Court held that the Employer was not entitled to accept the tender if the main Contractor does not discover the error before acceptance then the sub Contractor will be held to the quoted price.

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[9] McMaster University v. Wilchar Construction Ltd. [1971] 3 O.R. 801, 22 D.L.R. (3d) 9

1.10 Quantity errors

Often a contractual provision titled 'Estimated Quantities' determines the character of the contract as a re-measurement when the quantities given in the bill of quantities are estimates only. Quantities may vary with the actual site conditions, due to errors and omissions and on account of variations which shall not in any way vitiate or invalidate the contract. It is not intended for the Contractor to use the existing quantities as a basis to fulfil his contractual obligations such as making purchase orders, preparing schedules and programming of works etc. The provision of estimated quantities can not also be considered as limiting or extending the scope of work to be carried out. It is therefore necessary to determine exactly what the bill of quantities should contain and what they actually do contain. This would mean that the Engineer reserves the right to revisit the bill items and correct the estimated quantities based on physical measurements as far as no specific mention as to contrary have been made in the contract.

Quantities in a re-measurement contract are purely for the purpose of tendering where the price to be paid for the works will not be fully established until the works are complete. Measurements taken in absence of the requested Contractor's assistance are taken to be the correct measurement for payment purposes. If the Contractor does not attend to examine and agree the records prepared by the Engineer's representative for the measurement purpose, such measurements are reasonably presumed to be correct.

Further, the Contractor shall examine and take additional levels and measurements as necessary in substructure works before the ground is interfered and shall agree the existing levels with the Engineer. This will form the basis of measurement of the permanent works, which is extracted from topographic survey records (bathymetric survey in case of dredging works), unless otherwise at a different bench level called commencing surface as stated in the CESMM 3, for instance.

Some contracts find a clause titled 'Actual and Correct Quantities' particularly in lump sum modalities, which is sometimes optional to the clause 'Estimated Quantities'. Hence, the quantities set out in the bill of quantities are taken to be the actual and correct quantities to be executed by the Contractor. Any change in quantities including omissions shall not however vitiate the contract but shall be corrected and deemed to be a variation. On the other hand the Contractor is to intimate the Engineer of any change in original quantities of work soon as is made aware of. However, this clause does not emphasize that the Contractor should satisfy himself as an additional obligation in the tender itself that the quantities given in the tender document are a fair representation of the proposed works. Although the Contractor is given an opportunity to query any observation with regard to quantities during tender stage, it would be unfair by the Contractor for quantity errors committed by the Employer appointed consultant.

1.11 Principle of tender price leveling

Usually an instruction to tenderers has been included in tender forms that the tenderer shall furnish a break up showing the cost components he considered in arriving at the final quoted tender price. Although the tender price break up is a reflection of basic cost and mark up over and above the sub contract quoted amounts, it essentially means a detail distribution of the costs in terms of materials, labour, plant, site and head office overhead, profit and if possible the risk portion quoted against each lump sums and unit rates. Contractors usually contend that they are commercial secrets and pricing strategies not capable of being disclosed to others.

It should be noted that in order to facilitate the evaluation of work done, the Contractor is required to submit a detailed breakdown of tendered lump sums and unit rates as required by the Instructions to Tenderers. It is the tender price break-up that demonstrates the tender pricing level, the adherence to which is important in evaluating subsequent variations. Further it is important in arriving at a mark up allowable in valuing variations, in deciding the head office overhead component in claims for recovery for unabsorbed overhead in a contract prolongation as well as in evaluating loss of profit. More over, it is important to find out to some extent the costs allowed for the items that are not priced in the bill of quantities but has been included elsewhere within the tender sum.

However, such breakdown, though required by the contract is not itself a contract document and will be considered as a guide only, unless otherwise mentioned in the contract. The receipt of the breakdown in no way implies acceptance of figures and the Engineer reserves the right to amend or modify them as and when he deems it necessary. Hence, the tender price break-up (usually submitted after the contract has been let) is not, *per se*, a contract document. It may be used, wholly or partly, as a guide in pricing variations, and remains subservient to the requirements of the contract. In principle, any errors, omissions, oversights etc within the tender price break-up do not prove particular inclusion or exclusion within the contract sum. The nature of the inclusions within individual tender rates and prices are determined by the contract, not by the Contractor's subsequent break-up.

1.12 Tender review

Tender rules differ even within the public sector in the pursuit of public accountability. These rules govern the criteria of evaluating a tender which may or may not be specified in the tender documents. However, there is always an express right on the part of the Employer to accept or not to accept any tender, which is the Employer's prerogative.

Tender evaluation is meant to assess the relative strengths and weaknesses of each tender. First and foremost, the tender will be assessed to see if it complies with mandatory tender conditions. If it doesn't, it may be considered to be invalid and most probably eliminated from further evaluation. An assessment is then undertaken against each of the non-cost elements including technical merits, management competencies, financial viability and relevant experience as well as the risks or constraints associated with the offer. Sometimes, it is a subject of pre qualification using a comprehensive marks scheme on a weighted average basis. In many cases, this component of the assessment is a prerequisite for opening commercial offers. Only those successful in technical evaluation may be qualified for commercial evaluation.

Commercial evaluation is basically a value for money assessment that does not necessarily mean choosing the cheapest price, but it weighs up the benefits of tender against the whole-of-life costs, aiming the offer that provides the best value for money. One of the important concerns in any tender review is to detect the unbalanced bids.

Unbalanced bids occur basically in two circumstances; where a bidder places unrealistically high prices on certain items and low prices on other items. A bidder is able to do this by strategically overpricing bid items he believes will be used in greater quantities than estimated in the bid document and under pricing items he believes will be used in significantly lesser quantities. Also it occurs when a large number of work items that take place at the initial stage have been purposely quoted in high figures in such a way that the Contractor earns more money at the start than the right time along with the actual progress.

However a proper tender review seriously looks into the method of pricing in order to mitigate the risks associated with the award of unbalanced bids. Such a review will be governed by specific criteria in the determination of unbalanced bids. Pareto analysis is usually a part of tender review for mega projects where the Employer needs to identify trivial few. It is used for selection of a limited number of tasks that produce significant overall effect, using the pareto principle. In essence, it allows the management to focus on the 20% of the risks that have the most impact on the project. In construction tender review, it helps identify unbalanced bids by detecting the way the tender prices have been dispersed along with the major cost significant items.

1.13 Pre contract negotiations

Following a tender evaluation, the tender issuing authority often enters into negotiations with the prospective Contractor/s prior to decide on the award. The issues would be in relation to withdrawal of qualifications, offer of discounts, and even additional scope likely to be incorporated in a contract. However, Courts have placed an exclusionary rule on the admissibility of pre-contract negotiations in interpreting the meaning of a contract. This is because if evidence was admissible, parties might conduct negotiations to gain a later advantage, by making it appear a particular meaning had been agreed when it had not been.

There are exceptions to the exclusionary rule, also. Though it is rare indeed as a blue pencil rule, some Courts prefer to use the power to correct mistakes in a contract so that it accurately reflects the true agreement between the parties. A claim to rectification must be specifically pleaded where the evidence of negotiations is admissible in the rectification process. Also, where parties have relied on a shared understanding or agreement about certain facts, for example the meaning of a contractual undertaking such as in a parent company guarantee, the court may not permit any of them later to depart from that position if it would be unjust or unconscionable to do so. Again, evidence of negotiations may be admissible in the context of a claim, which is called estoppel by convention.

Evidence of pre-contract negotiations is also admissible to establish that parties habitually used words in an unconventional sense, in support of an argument that words in a contract should bear a similarly unconventional meaning. This is called private dictionary rule which says that evidence of negotiations was admissible where the contract was capable of bearing more than one meaning. In these circumstances, rectification is the appropriate route.

Another instance is when a claim for misrepresentation requires the defendant to make a false statement, which is untrue, which induces the claimant to enter into the contract, and which causes loss. A misrepresentation is likely to occur during pre-contract negotiations, and therefore evidence about those negotiations would be admissible.

However, almost in all cases, the parties once mutually agreed in crystal clear terms may sign an endorsement to the effect that they are applicable as if they are part and parcel of the tender in acceptance. Considerations arising out of all negotiations, clarifications, verbal communiqués etc during the pre contract stage, where mutually agreed, will be reduced to writing in order to give effect in contract. This requirement has been made condition precedent prior to receive a legal effect, generally through a prior agreement or entire contract agreement clause.

1.14 Manipulation in discounting

It was a 5 km single access way to a resort site, awarded in the sum of $ 3,379,397 on measure and pay basis, with a scheduled completion of 12 months. The project scope included circa 500k m3 of earth cut in severe mountain, slop-stabilization, and rip rap to embankment but excluding asphalt work. The general summery of the bill of quantities showed a lump sum discount on bill No 3, measured works (of $ 383,595.08) which was offered by the Contractor on the request of the Employer to match with the lowest offer it received. Within two to three months after commencement, the Contractor started claiming work done entirely on a set of new rates, alleging that they are discounted rates exactly in line with what was bargained for.

It was found that the tender price break up submitted was entirely different from tendered rates. A question arose how this discount is applied in bill rates. There were three options; apply discount in proportion to measured works as a percentage, revise the bill rates in any manner to maintain the sum named in the letter of intent, or deduct only the lump sum discount and apply the tendered bill rates without revision.

It is clear that the third option limits the extent of benefit within the amount of $ 383,595.08 in no relation to work done. This discount is based on the estimated quantities and has no ultimate bearing on the actual work done which might cause an imbalance in the adjustment of contract sum from the real sense of discounting. It may also be unfair by the Contractor even when the actual quantities become substantially low compared to the quantities given in the tender. The Contractor argues that the second option is contractual since it was the initial bargain with the Employer as stated in the letter of intent. There was no agreement as to application of discount factor in proportion to the measured works and the first option was therefore invalid. Also, the option of distributing the discount amongst the bill rates will not change the sum named in the letter of intent.

However, the Contractor's argument is not defensive enough to invalidate the Employer's position since no method of discounting has been specified. It conveys only the message that the rates shall be revised. The last argument is also invalid in that the distribution of discount factor is uneven, resulting in a windfall to the Contractor when actual final quantities are referred to. The new rates proposed by the Contractor appeared to have been individually recalculated three months after the commencement where any experienced Contractor can in no doubt be firm in calculating the ups and downs of the estimated quantities by the time the final account is prepared.

Such a rate revision openly violates the contract. Even in circumstances where an existing rate is found to be unreasonable or inapplicable, the Engineer fixes a rate not arbitrarily but logically by giving due regard to all circumstances. It was therefore proposed that any discount or correction factor be applicable in proportion to the value of the measured work in bill No 3 as clearly indicated in the general summery of the bill of quantities since nothing has been mentioned as to contrary in the letter of intent. This compiles with the general quantity surveying practice and does not harm the primary intent of the variation clause, but does prevent the Contractor manipulating discount to own advantage.

On some reason the Employer agreed with the Contractor's proposal. The repercussions were costlier than $ 95,807 being additional payment as forecasted in the monthly financial report No 4 (Appendix A). This was a pure loss to the Employer and an undue profit to the Contractor. To bridge this gap of finance, the Employer had to seek many technical sacrifices such as lowering the embankment thus reducing fill volumes, curtailing the scope of work such as changing the alignment and reducing the rip rap area and top of all, relaxing the specification for roads in reducing the minimum standard rip rap area for the slope stabilization. Although unseen at the beginning of the issue, another domino effect is whenever the Engineer attempted to value the varied works using the new rates. Since the negotiated revised rates have been approved and binding equally for valuing variations, the net resultant effect amounted to $ 8000 additionally paid to the Contractor.

Ultimately, the project experienced a severe financial crisis because the parties started giving different interpretations to the issue of discounting. Indeed the method of discounting should have been specified in the letter of intent thus avoiding any subsequent strategic manipulations.

1.15 Form of agreement

A provision dedicated for the contract formality deals with the preparation and signing of the formal contract agreement, which is to be prepared, modified as necessary and completed at the cost of the Employer.

The Contractor may bring to the notice of the Employer any discrepancies observed in the contract documents prior to sign it. With the signing of the form of agreement, the contract between the parties receives its formal identity in which the Contractor confirms that he desires to execute the works as described within the contract documents having understood the nature and scope of work to be carried out. A person signing a document is supposed to know the legal implications of his actions and cannot usually claim that he signed under a mistake. A contract once signed follows legal consequences. The defence of '*non est factum*' recognises an exception to this rule which is available to a person who executes a document in ignorance of its real nature. Such a person could repudiate a contract even against third parties who may have acted in good faith.

One of the prerequisites to signing form of agreement, as usually imposed in the Appendix to Form of Agreement, is that the Contractor shall submit notarially authenticated copies of original documents defining the constitution of the company, powers of attorney and other documents in case of international contracts. The local Contractors shall submit details of the nature of the company prior to sign the form of agreement.

1.16 Documents mutually explanatory

A contract requirement is latently ambiguous if it is subject to more than one reasonable interpretation and if the ambiguity is sufficiently subtle so that an experienced Contractor would not be expected to detect the ambiguity prior to bid submittal. If the Contractor relied upon its reasonable interpretation when pricing the tendered scope and the Employer imposes a contrary interpretation, the Contractor may recover for a constructive change.

An ambiguity is patent if it is so obvious that an experienced Contractor should detect it prior to bid submittal. This does not mean an irrevocable conflict exists within the contract documents. As with latent ambiguities, patently ambiguous contract requirements are subject to more than one reasonable interpretation.

In case an ambiguity is found when the contract documents are read together, the Engineer shall instruct what is to be applied. Some international conditions offer an order of precedence for the interpretation of various documents forming the contract. Accordingly, the clause establishing the order of precedence does prioritize the application of various parts of the contract document in resolving an ambiguity. Also, a tender shall be deemed to allow for the requirements of the tender drawings, specifications and bill of quantities, all of which form part of the tender document. In the event any discrepancy between the details of drawings and the descriptions in the specifications or in bill of quantities is found, then such items shall be deemed to have been priced in accordance with the description of the bill of quantities. This is relatively a reasonable judgment since the bill of quantities provides the immediate basis of the quoted tender price. However in a typical lump sum contract, it is the drawings and specifications that define the scope of work. Equally if matters of interpretative doubt exist between the general conditions and conditions of particular application, it would be the conditions of particular application that take precedence in application since they have been amended to suit the particular contract.

Hence, it is ambiguity that usually invites interpretation. Ambiguity is defined as capable of bringing more than one meaning when viewed objectively; be them 'patent ambiguity' resulting from the language of the contract or 'latent ambiguity' when the language is applied to a factual situation. Conversely, however, contractual language is unambiguous when it has a definite and precise meaning, unattended by any danger of misconception in the purport of the contract itself.

Whenever an ambiguity is identified at the time of tender, which is readily apparent on the face of the documents and should have been capable of identification and clarification, the matter should be cleared with the Engineer. Alternatively, it can be taken up in a site level exchange of ideas for a solution that helps parties to come to a win-win situation. Proceeding to a contract with a known and recognized ambiguity is to invite contention and probable loss on the part of the Contractor. This is why the tenderers are usually instructed to set forth in writing any doubt or obscurity found in tender documents to the tender issuing authority on or before the period as specified.

The Engineer is obliged to make his own interpretation based not only between two documents but also within documents. If the Contractor can demonstrate the existence of an ambiguity, which he could not foresee at the time of tender, he ought to be reasonably compensated. Because the ambiguity is of a latent nature and it will thus not have been possible to resolve at the time of tender, then the Engineer is required to certify the Employer to pay such additional sum as may be reasonable to cover such cost if actually suffered. The criterion that influences the admission of such cost into the accounts is therefore threefold;

a. Such cost has been incurred in the opinion of the Engineer
b. The Contractor did not anticipate the cost, and
c. The Contractor had a valid reason not to anticipate such cost

Standard form of contracts usually empowers the Engineer to decide on the extent of the Contractor's capacity to foresee any ambiguity and thereby the cost effect on the contract. If the Engineer or the Contractor gives the other written notice specifying the same, the Engineer shall issue clarification or instruction on the subject ambiguity.

1.17 Amendment or deletion

Although the general conditions of contract are for general application, some Employers prefer to either amend or delete some of the standard provisions. This trend is apparently because they falsely assume that by deleting or amending, the Employer is getting immunity from potential claims. Unfortunately, this logic is flawed and deletion or improper amendment of such clauses is disadvantageous and, in some cases, even dangerous. The thumb rule is that if the Contractor does not have an entitlement within the Contract, he may well raise a claim outside the contract, if there is an overriding statutory provision. Since the contracts are construed in accordance with the local statutory provisions pertaining to governance of commercial contracts, deletion does not necessarily mean that no one is entitled or is loosing any right to claim, but it would obviously mean that the contract is silent where a resolution lies in the next available route, either by referring to similar case law or standard norms of the building trade. More over, it is legally possible for a Contractor to raise a claim outside the contract if he has been hindered by the Employer for instance in line with the prevention principle (which obliges both parties to co-operate and not hinder the other from fulfilling obligations). This is applicable even if the Contract does not have a provision for submitting claims.

Another example is that, many standard forms require the Contractor to submit a notice within 28 days and maintain contemporary records to support his claims if any. If the Contractor does not submit a notice within 28 days, his claim could be 'time barred' and he could lose his rights to an extension of time and/or other entitlements. If this time frame has been amended with the phrase such as 'as soon as practicable', it does not amount to a condition precedent to lodge a claim but results in an open-ended time frame, requiring a technical interpretation on the term 'practicable' in order to establish the right to even open up the claim submission.

The case of *Balfour Beatty v Docklands Light Railway*[10] is a classic example to show the danger behind amendment of standard forms. It was ICE 5th Edition, but two significant amendments had been made. Firstly, the independent Engineer was replaced by an Employer's Representative and, secondly, the clause 66 dispute provision had been deleted entirely. It is important to note that had the arbitration clause not been deleted it would have contained the right of the arbitrator to 'open up, review and revise decisions of the contract administrator'. Given the clause had been deleted, did the Court have the power to open up, review and revise decisions of the Employer's Representative? The Court held that they did not have such power and the Contractor's entitlement to payment and extension of time was dependent on the judgment of the Employer's Representative. Whilst it was held that the Employer's Representative had a duty to act honestly, fairly and reasonably, the Court held that there was no means of contesting the Employer's Representative's decisions and that they became final and binding.

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[10] Balfour Beatty Civil Engineering Ltd v Docklands Light Railway Ltd (1996) C.I.L.L. 1143; 78 B.L.R

Hence, it is always better not to touch the general conditions but to have properly amended clauses in the conditions of particular application to suit the local requirements. It will help secure the primary intention of the standard clauses that are already stipulated in line with a contractual philosophy in mind.

1.18 Silence

Silence is more dangerous than deletion. The premise behind this line of thinking is that the parties have taken on board the risk of deletion at the time they entered into the contract itself, but silence may purport acceptance, that is *qui tacet consentire videtur* meaning he who is silent appears to consent. An example is a lump sum fixed-priced contract without a provision for price escalation in which case any open market vacillations are a risk to the Contractors, even in contracts having long durations. As a result, Contractors may definitely search for alternative recovery means, of course through claims on their own basis.

Employers must therefore take utmost care in amending standard clauses when they customize their contracts so as to avoid backfiring, especially a change to one clause may have an impact on another clause and so is the knock-on effect. Those amending contracts must always have in back of their minds the contra-preferentum rule. Essentially it provides that if there is an ambiguity in a document which means a clause could have two alternative meanings, then the Court may construe the words against the party who initiated the document (i.e. usually the Employer) and give effect to the meaning more favourable to the other party.

1.19 Invalidating a contract

Even if all the ingredients that are necessary for the formation of a valid contract are present, a contract could be invalidated due to certain factors, namely duress, undue influence, misrepresentation, mistake and illegality, that any judicature would invalidate a contract. Duress is present when a person acts or forbears from acting under a fear of danger which is so compelling as to deprive him of his freedom of will. Actual or threatened danger means a physical danger to a person and not unduly influencing a person.

Duress is economic when connected with money factor. Courts are normally slow to interfere in agreements reached between two parties, but they will interfere in agreements procured by the exertion of economic duress by one party over the other. The ingredients of actionable economic duress are the compulsion on, or a lack of practical choice for, the victim. The pressure must be illegitimate and a significant cause which induces the victim to agree to enter into the agreement. As such, the Contractor may contest under duress when the Engineer unilaterally fixed a rate for new work without giving the Contractor a room for negotiation.

1.20 Undue influence

Undue influence is present when the consent of a party is not voluntary and has been influenced by words or conduct of the other. Such a contract is voidable in presence of law. It must be proved by the person alleging the undue influence that his decision to form the contract was made because of the undue influence experienced by him. A special relationship need not exist in order to allege undue influence. The mere fact of domination is fair enough to get a contract invalidated on the reason of undue influence.

Another situation is where there is a special relationship between the parties. When such a special relationship can be proved to exist between two contracting parties, there is a presumption of undue influence under English law. This presumption applies to relationships of parent and child, lawyer and Employer, doctor and patient, religious adviser and follower (but does not apply to relationships of husband and wife, Employer and employee and to that of Employer and agent). The burden of disproving this presumption falls on the party against whom it is alleged. However, no single test can be used in order to rebut the presumption of undue influence. The manner in which the presumption could be rebutted would depend on the facts of each case. If the presumption cannot be rebutted the Court may interfere on the basis of public policy. A transaction procured by undue influence cannot be set aside when there is a long delay in alleging influence.

1.21 Misrepresentation

A misrepresentation is a false statement of fact made by one party to a contract (the representor) to the other (the representee) which, while not forming a term of the contract, is yet one of the reasons that induces the representee to enter into the contract. Silence does not amount to a misrepresentation since a false statement must be made for a misrepresentation to have occurred. However, there are exceptions to this rule that silence does not amount to a misrepresentation; where the silence distorts a positive representation, where the contract requires utmost good faith, and where a fiduciary relationship exists between the contracting parties.

It is necessary at the outset to distinguish between misleading statements which are intended to be terms of a contract and those which are not intended to be terms of a contract but nevertheless induce one party to enter into a contract. A party misled by a statement which is a term of the contract is entitled to damages for breach of contract. A person affected by the other category of statement is not entitled to damages for breach of contract but he can get relief on the basis of rules relating to misrepresentation. The law will provide for misrepresentation only if it is a false statement of existing fact.

A misrepresentation must also relate to some existing fact so that statements which are mere puffs, statements of intention, statements of opinion and statements of law do not qualify as representations for the purpose of obtaining relief. The misleading statement must be addressed by the representor to the party misled and the representation must induce the contract as stated. If the representee never knew of the misrepresentation, if he did not allow the misrepresentation to affect his judgment or if he was aware of its untruth, the misrepresentation has no legal effect.

A claim for intentional misrepresentation is usually predicated on the assertion that the defendant induced the plaintiff to enter into some transaction or relationship by misrepresenting material facts pertaining to the relationship or transaction. In this context, the elements of intentional misrepresentation include: 1) the misrepresentation of a material fact; 2) knowledge of falsity (scienter); 3) intent to induce reliance; 4) actual and justifiable reliance on the misrepresentation; and 5) resulting damage. When these elements are present, the complaint will seek punitive damages. This is because the existence of fraud is one of the reasons upon which exemplary damages may be predicated.

Any misrepresentation which was not falsely induced is an innocent misrepresentation. However, a misrepresentation becomes innocent only if the elements of fraud and negligence are missing. For example A represents to B that oil deposits exist at a certain place. A honestly believes this to be true although there are no oil deposits; B believes the representation and enters into a contract for drilling with A. Here A's statement amounts to innocent misrepresentation.

Innocent misrepresentation is a ground for rescinding a contract. This remedy requires the parties to restore to each other whatever they received under the contract. Innocent misrepresentation is also available as a defence to an action for specific performance. Utilising the above example again, if A files action for specific performance against B because B refuses to continue drilling for oil, B could use A's innocent misrepresentation as a defence in the lawsuit. However innocent misrepresentation is not a ground for claiming damages. Only in exceptional circumstances a Court may grant restitution as opposed to compensatory damages. Restitutional damages would entitle the recipient to be placed in the same position as if he had not entered into the contract or he could elect to retain the subject matter of the contract. Courts may grant an indemnity as opposed to damages in exceptional cases, with a view to releasing a party from burdens which arise as a result of the contract as opposed to mere losses that have been incurred.

Dishonesty is the basis of fraudulent misrepresentation. Accordingly, a representor would not be liable if he honestly believes in the truth of the representation; it is not necessary for him to know that the facts he states are true. In the English case of *Derry vs. Peek*[11] the directors of a company who issued a prospectus which stated that the company had the right to run plants by steam or mechanical power, honestly believed that the relevant authority would give its consent to do so. Therefore, a person who bought shares in the company which was wound up when the relevant authority refused it consent could not prove fraud.

An example is when a defendant, under an affirmative duty to disclose all material facts, conceals facts in order that the plaintiff may be induced to enter into a transaction or relationship. These claims differ from claims predicated on intentional misrepresentation in that notwithstanding the absence of any affirmative misrepresentation, the law provides for recovery when plaintiff is damaged as a result of concealment. A primary issue to be determined in these cases is whether the defendant stood in such a relation to the plaintiff as to give rise to an affirmative duty of disclosure under the circumstances. Once that duty is established, the remaining elements of actionable fraud, including intent to induce reliance, justifiable reliance, and resulting damage, are established as in cases involving affirmative misrepresentations.

A fraudulent intention is a necessary ingredient in establishing a fraudulent misrepresentation. This means that if the representor acted with a good motive in misleading the representee to do something, the representation would not be considered fraudulent. In determining whether a fraudulent intention exists or not, the Courts would adopt an objective approach. Accordingly, if a man conducts himself in a way as to lead to the reasonable inference that he had a particular intention, that intention would be attributed to him. A person who has been induced to enter into a contract by a fraudulent misrepresentation has the remedies where he could set up the fraud as a defence to an action for specific performance, where he could ask for rescission of the contract and finally he could sue for damages.

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[11] Derry v Peek (1889) LR 14 App Cas 337

A misrepresentation which is negligently made by one party to a contract could also entitle the other party to have the contract rescinded. Other than the remedy of rescission, a person induced to entering into a contract by a negligent misrepresentation of the other party could claim damages from the person making the negligent misrepresentation.

Negligent misrepresentation involves many of the elements of intentional misrepresentation, although the cause of action is characterized by a less culpable mental state. Thus, the plaintiff in a negligent misrepresentation must prove: 1) a misrepresentation of material fact; 2) intent to induce reliance; 3) justifiable reliance on the misrepresentation; and 4) resulting damage. The scienter element differs, however; negligent misrepresentation occurs when a defendant's false statement is made without a reasonable ground for a belief in the truth of the misrepresented fact.

1.22 Mistake

If a mistake as to an essential part of the contract has been made by one or both contracting parties the contract is either prevented or nullified. Therefore, there are mistakes which either prevent agreement, such as mutual mistake and unilateral mistake or mistakes which nullify agreement such as common mistake. Mutual mistake occurs where each party may be mistaken as to the other's intention although each is ignorant that any mistake exists. For example, X offers to sell his old dozer to Y but Y thinks that X is referring to his new dozer. In determining whether this mistake prevents agreement the Courts adopt an objective approach. That is, would a reasonable man have entered into a contract by such a mistake? If he would have done so, the mistake would prevent agreement.

A unilateral mistake occurs where only one party is mistaken and that mistake is known or ought to be known to the other. For example, A agrees to buy polished granite marble from B thinking it is Italy made travetino type but it is in fact grit blasted tiles made of cut stones. If B knows the mistake or ought to know it, the contract is prevented, If B is ignorant of A's erroneous belief, the case is one of mutual mistake. In unilateral mistake, the knowledge of the error makes it impossible to apply the objective test of intention. Therefore, where there is a unilateral mistake the Court adopts a subjective approach and allows the mistaken party to show the effect of the mistake in his mind. In both mutual and unilateral mistake, the mistake must relate to a term of the contract.

Hurst case[12] is an example to show unilateral mistake. The Hurst's Project Manager (PM), who has been routinely signing the monthly interim statements, signed a variant of the final account statement on a different format without knowing that he has no authority to sign. Neither was he convinced of the revised wording which he himself had overlooked nor he appreciated that by the "full and final settlement" terms, Hurst was being invited to forego loss and expense claims. Accordingly, Hurst submitted the final account including additional preliminaries and cost on disruption after several months. Mace refused to accept on the basis that there was already an agreed and signed final account statement on the variant to the ISA form.

The adjudicator found that, because of the signed final account statement, Hurst were prevented from making further claims for additional costs that had accrued up to the date of signing. Hurst sought an affirmation through the court that the signed variant was not binding because there was a unilateral mistake by their PM who did not have the authority to make a binding compromise. Subsequently, the Court found that there was a unilateral mistake by Hurst's PM and that rectification to that document should be made to delete the reference to full and final settlement of all claims etc on the premise that there was knowledge (but not necessarily proven actual knowledge) by the other party of the unilateral mistake. There was ample consideration and no estoppel applicable.

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[12] Hurst Stores and Interiors Ltd. v M L Europe Property Ltd (2004) CA (Civ Div).

A mistake by both parties to a contract as to a fundamental fact would nullify the agreement. In this situation each person would know what the other's intention is, but each would be mistaken about the same fact. This is common mistake for example; A agrees to pay for surcharge on borrow pit for suitable soil to embankment from B. Unknown to both A and B the soil was incapable of meeting the specification. Therefore, both A and B would be under the common mistake that the soil was suitable.

1.23 Reasonable error

In the case of *Pile Foundation Co v. Berger, Lehman Associates*[13] (1998) where the Contractor submitted his bid in reliance upon information provided by the Engineer, and the site conditions differed from what was represented, the Contractor sued the Engineer for misrepresenting the conditions. The Contractor claimed that his bid was wholly depended on site information the Engineer furnished at the time of bidding. However, it was inadequate to cover the actual project costs, as the Contractor asserted, because the site conditions were negligently misrepresented by the Engineer. The Contractor claimed recovery for breach of contract by the Engineer. Also, he claimed recovery under the negligent misrepresentation of material facts. Dismissing the allegations, the Court stated that the Contractor had no privity of contract with the Engineer. The separate contracts did not show any intent to confer any rights upon the Contractor against the Engineer. The Court however considered on the allegation of negligent misrepresentation by quoting the relationship between the plaintiff and the defendant which was so close as to be the functional equivalent of privity of contract. Whether the Employer intended the Contractor to rely only upon the Contractor's own site investigation was found by the Court to be a matter to be decided by a jury. Since the case is technical in nature, the jury had to search whether the facts in issue was fundamental to the extent that the Contractor's reliance is inevitable in his judgment on the bid price.

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[13] Pile Foundation Construction Co., Inc. v. Berger, Lehman Associates, P.C., 676 N.Y.S. 2d 664, 1998 N.Y. App. Div

In nutshell, a party may bring an action for rescission of the contract on the ground of mistake, misrepresentation, duress, and undue influence. A contract is voidable if it is susceptible to escape a contract on these grounds. Sometimes, the parties may attach a different meaning to the terms of their bargain, each mistakenly thinking that the other attaches the same meaning to those terms. The law permits escape in some of these cases of misunderstanding. This is when one or both parties may have entered into a bargain at least partially based upon a belief that is not in accord with the facts. This type of a mistaken assumption constitutes unilateral if only one of the parties is mistaken and mutual if both party shares.

Whether or not a contract entered on the basis of mistaken assumption may be avoided depends upon several factors, including the nature of the mistake, its effect upon the value of the bargain, and the risks assumed by the parties. In remorse in disguise, a party decides that entering the contract was an error in judgment, because the bargain turns out to be less valuable. The law affords no relief for a mistake of this kind because 'the gambler is stuck with the results of the wager'.

Words or conduct of a party that misrepresent conceal facts, or the failure of one party to disclose facts known to her, may induce the other to enter into a contract based on incorrect assumptions. Justifiable reliance upon a misrepresentation may in some cases permit the party who is misled to avoid the contract. Avoidance because of misrepresentation is therefore closely akin to avoidance because of mistake, the only difference being the cause of the erroneous assumption. A fraud is a misrepresentation that induces a party to enter a contract that he might otherwise not have entered but for the misrepresentation. In contrast, a fraud in *factum* is detrimental in that a one party does not even understand that he is entering into a contract because of a misrepresentation.

Misrepresentation that induces assent of the other party is fraudulent when the party making the representation (or concealing a fact) intends the representation to induce assent by the other party and knows the representation to be untrue. In lieu of avoiding a contract on the ground of misrepresentation, an aggrieved party while 'living with the contract' may sometimes seek tort damages in an action for deceit.

1.24 Illegality

A contract could be made illegal by statute, by common law or on the grounds of public policy or morality so that the performance agreed upon or the ultimate purpose of both parties in contracting is prohibited.

An illegal contract is void i.e. it is *devoid* of any legal consequences. Parties cannot sue for specific performance of the contract or for recovery of damages for non-performance. There are two principles relating to the consequences of illegality. No action can be found on illegal transaction. Also, where guilt is equal, the defendant's position is superior.

The first rule would apply where a claim is made by a landlord to recover an illegal payment promised to him by a tenant. If the tenant has already paid the prohibited rent, he cannot recover it on the basis of the second rule. Although there are no exceptions to the operation of the first rule, certain exceptions to the operation of the second rule are available. One exception to this rule is where the defendant would be unjustly enriched at the plaintiff's expense. Another exception is where the contract is substantially unperformed. The third exception operates where the plaintiff's guilt cannot be established or his guilt, even if established is not equal to the guilt of the defendant. Another exception to the operation of this rule is when consideration of justice or public policy requires that the plaintiff to an illegal contract should be given relief. A further exception would be if the lawful part of an agreement can be severed from the unlawful part, effect will be given to the lawful part signed by the parties to the contract.

1.25 Terms and representations

Undertakings and promises that are contained in a contract are known as the terms of a contract. They have to be distinguished from representations which are made before a contract has been entered into and are not intended to form an integral part of a contract. Because Courts have found considerable difficulty in determining whether a statement is a term or a representation, they have formulated various tests as a guide to distinguish a term from a representation, as follows.

a. Taking note of the time lapse between the time of making the statement and the final execution of the contract
b. Considering the importance of such statement in the minds of the parties
c. Concluding that, if the statement is followed by the execution of a formal contract in writing, and that statement is not incorporated in the written document, it is merely a representation
d. Regarding a statement as a contractual term, if the maker of the statement is in a better position to ascertain the accuracy of the statement, compared to the other party

These tests however are not conclusive and it has been suggested that the best way of determining whether a statement is a term or a mere representation is to examine whether there is evidence of an intention to create a contractual liability in respect of the statement.

1.26 Conditions and warranties

A condition is a vital term of a contract, which goes to the root of the contract and a breach of which entitles the injured party to rescind the contract and sue for damages. A warranty is not a vital term in a contract, but an ancillary one, a breach of which gives the injured party no right to rescind the contract but only a right to sue for damages. A condition affects the very existence of the contract; therefore, where there is a breach of a condition the rescission of the contract by the injured party does not arise. Such a contract would automatically end.

Courts however concentrate on the effects of the breach rather than the quality of the term broken. This guideline was formulated in a case where although the ship was un-seaworthy, (which was contrary to a term of the contract) only delays in shipping occurred. It was held that this did not entitle the injured party to repudiate the contract and they could only claim damages. On this basis, even if the breach of a minor term causes severe loss, the injured party may be able to rescind the contract.

The other guideline in determining whether a term in a contract is a condition or a warranty is to examine the contract at the time it was made and infer the intention of the parties. In one case although a clause in the contract stated 'expected ready to load under this charter about 1 July 1965' the ship was delayed almost a month. It was found that at the time the contract was made the Employers had no reasonable grounds for believing that the ship would be ready about the first of July. It was held that the 'expected ready to load' clause was a condition, a breach of which entitled the charterers of the ship to rescind the contract. The Court did not wish to examine the effect of the breach.

Sometimes, a contractual term may turn out to be either a condition when it is integral to the contract or a warranty when it is incidental to the contract, depending on its effect on the injured party. Although the distinction (between conditions and warranties) is clearly demarcated in the law of contract, it may not be always applicable to all types of breaches since some contractual undertakings are too complicated to be fitted into a one scheme, unless provided for expressly in the contract. This 'wait-and-see' approach, till the effects cease is aimed to achieve fairness possibly more than by a priori classification under the contract. This is because for instance a breach goes so much to the root of the contract that it makes further performance impossible, the innocent party will be entitled to be discharged from further obligation. But, if the event does not cause that much effect, its consequences can be remedied by an award of damages. Terms falling into this category are sometimes described as 'innominate' clauses and are not to anyway replace the traditional classification into conditions and warranties in those areas where such a division has been made by statute or judicial decision.

In Hong Kong Fir Shipping v Kawasaki Kisen Kaisha (1962) 2 QB 26 Court of Appeal, a ship was chartered to the defendants for a 2 year period on the agreement the ship would be seaworthy throughout the period of hire. The problems developed with the engine of the ship and the engine crew was incompetent to bring them into operable status. Consequently the ship was out of service for a 5 week period and then a further 15 week period. The defendants treated this as a breach of condition and ended the contract. The claimants brought an action for wrongful repudiation arguing the term relating to seaworthiness was not a condition of the contract. It was held that the defendants were liable for wrongful repudiation, adopting the innominate approach. Rather than seeking to classify the term itself as a condition or warranty, the court looked to the effect of the breach and found that the breach has not substantially deprived the whole benefit of the contract. 20 weeks out of a 2 year contract period did not substantially deprive the defendants of whole benefit and therefore they were not entitled to repudiate the contract.

1.27 Delict

Since a contract is an agreement between parties, legal rights and obligations generally flow from the agreement and arise only between the parties. Contractual liability depends on the consent of the contracting parties although the basis of the contract is generally the agreement. Equally the aim of the law is to ensure that the contractual promises are met by the parties. A delictual obligation generally arises because the law has declared that such an obligation flows from the relationship between the parties even irrespective of any agreement. Duties are thus imposed by the law irrespective of the agreement. The law of delict also aims to compensate for harm or loss caused and, in doing so to prevent future occurrences of that nature. Hence, it is not concerned with enforcing promises.

A Court awards damages to the victim or makes an order, which is described as an injunction, restraining continuation of the wrongful conduct. Both types of legal relief are available in the law of contract and delict. Yet since the basis of the legal obligation in contract and delict is different, in delict a person claims a sum of damages that is not predetermined but is assessed by the Courts. A victim claims un-liquidated damages in delict and liquidated damages in breach of contract, for example.

1.28 Summary

Construction activities involve a good deal of 'contracting'. The starting point is the contract between the parties and its components. Contract is a legally enforceable agreement that binds 'relationships'. To an extent, a contract determines how the parties should act upon in various 'circumstances'. There is no substitute for reading a contract. However, the parties to a contract can mutually agree in any manner they wish, and can also waive the requirements of their contract if that is acceptable, as long as they do not prejudice the existing laws. A party who seeks to incorporate a provision that exempts him from what would otherwise be of his obligation and misrepresents the effects of this provision to the other party; he will not be entitled to rely upon such exemption. If it conveys a false impression misleading the other on the actual facts, the losing party owes damages.

There may be a number of contracts, when the project is a larger one. This is a case of 'horizontal multiplicity'. If the contract is a complex one, then there may be a hierarchy in the supply chain. In each transaction, there are defined legal consequences. Undoubtedly, there is no separate set of legal rules for construction contracts, albeit the law governing construction contracts has been derived in a broad sense from the same sources of law, as are the sources relevant to any other contract.

The basic sources are the law of contract and the law of tort, subject to specific statues in addition to them, and they are generally construed in the law of the land, and no contract can overtake, supersede or fundamentally 'go against' the supreme law of the land. However, certain aspects in these branches of law still require special relevance in the context of construction contracts, simply because of the special features inherent in construction. Amongst them are that the industry itself is heterogeneous having its own practices.

Constructions are projects, each having a definite duration with time to start and finish of inter-related activities involving numerous parties, who must work in unison - though temporarily. Also, some of the problems that arise in the working of the project are not foreseeable or, even if they are foreseeable, their magnitude may not be foreseeable.

CHAPTER 2
CONTRACT AND PRICING MODALITIES

2.1 Introduction

Procurement method is a term that has been very much interchangeably used with other terms such as procurement strategy, procurement route, contractual arrangement, contract type etc. In avoiding debates over the titles assignable at varying contexts, it is safer to steer clear of defining these terms. Categorically, they all are contract modalities. The selection and implementation of appropriate modality is where the stakeholders should take utmost care at the outset since each modality has its own implications.

Construction procurement is all about acquiring the intended construction project, facility or plant via a contract modality. The choice of procurement method depends on a gamut of economic, legal and technical factors depending on the stakeholder interests and more over the nature, type, complexity or even the source of finance. The importance of the above factors has been varying.

2.2 Design-bid-build traditional route

Design-bid-build is the most traditional method of procurement where the Contractor and consultants are appointed directly by the Employer under separate contracts. The Employer will employ outside consultants and alternatively, will deploy in-house technical resources to carry out the services related to design and supervision. Some construction works will also be executed on domestic sub contract basis. This method of procurement is suitable for all Employers, including those inexperienced to undertake complex projects and projects where functionality, timely completion and cost certainty are prime objectives.

This strategy is a low-risk option for those Employers who wish to minimise their exposure to the risks of overspend, delays or design failure. However, the exposure to risk will increase where the design phase is unnecessarily rushed, where unreasonable time targets are set or where the tender documents are not fully fledged at their disposal.

In two-stage tendering under design bid build, the tenders for construction are based on consultant's designs (stage 1 tender). The Contractor then assists with the final development of the design and tender documents, against which tenders for the construction works are prepared (stage 2 tender). Whoever put forward the first stage tender has the opportunity to tender or negotiate the second (construction) stage. This approach increases the risks of increase in overall price and a less certain completion date. Sometimes, two envelop system has been adopted where the envelop 1 consists the technical components and the envelop 2 is the commercial offer which is opened only when the technical offer has been successful.

As such, the traditional design-bid-build route has a segmented and sequential process in which the Employer first contracts with a design professional to prepare detailed construction plans and specifications in order to solicit competitive bids for construction, and finally awards the construction contract to the lowest bidder quite frequently. The design and construction phases of the project are clear and distinct. Usually much of the work is sub-contracted to specialist firms as mentioned but the Contractor remains liable. The consultants administer the contract on behalf of the Employer.

In this route, it is important that the design documents are scrupulous enough to lessen the chance of ambiguity. This method should allow sufficient time to consider alternatives and to complete a thoroughly integrated design. The disadvantages are that it takes the greatest amount of time to complete and that the designers and builders can be in rivalry when the design is not buildable or the method of execution is not technically conducive. This route is most frequently done using a lump sum bid contract, but guaranteed maximum price is also used.

The separation of the Contractor from the design can also mean many lost opportunities for valid technical inputs. The financial commitment for the Employer increases from one stage to the next and the whole process can be stopped at any time up to letting the main contract, the 'only' penalty being abortive work by the design team. Hence, the overriding factor to a successful design-bid-build project is for the Employer to ensure that the design and bid documents are as complete as possible prior to float the project on tender so that the tenderers can recognize the same in true perspective.

Also, the Employer warrants the correctness of the plans and specifications to the Contractor under the Spearin doctrine. There can be design mistakes for which the Employer is liable to the Contractor under the warranty of correctness but cannot easily transfer the liability on to the design professional. Even when the designer is in fact negligent, proving negligence can be difficult. The Employer must obtain a certificate of merit from another design professional and then prove that the designer failed to meet the standard of care, which requires expert testimony. On the other hand, the Contractor usually can prove there was a defect in the plans that cost the Contractor more money based on fact testimony alone.

2.3 Design and build basis

By definition, the Contractor takes over the responsibility for both the design and construction making a single point of contact. The Employer's needs must be properly articulated in the document called the Employer's requirements consisting of an initial concept to develop the design and carry out the construction work, usually for a fixed price. At least an outline design must be produced in order to receive a detailed price. This is where the design parameters and hypothesis are established in the Employer's requirements forming part of the tender document. The bidders are instructed to submit their technical proposals within the parameters so established in the Employer's brief and are free to submit alternative design proposals in separate envelops.

There are advantages in using a design and build form of contract. First, the construction team is motivated to work with the design team to develop a design with constructability in mind. In that way the team creatively finds possible ways of reducing construction costs without technical sacrifice. The Employer can entertain the benefit of constant design response. Construction can take place concurrently with the development of the design unlike in a traditional contract, where construction cannot begin until after the design is finished, the project is bid and awarded, and the team can mobilize.

As opposed to a more gradual commitment associated with the traditional approach, the Employer makes a commitment to the cost of the building works as well as the cost of the design work at an earlier stage. Changes made by the Employer during the design stage can be expensive and they may sometimes affect the basic design parameters established at the beginning. Employer's briefs incomplete in details may sometimes prejudice the motive behind design and build approach. This method of procurement can be suitable for Employers requiring distance from the project, cost certainty, and faster track.

Design-Build is also intended to save time. Generally, the stages are sequential with little overlap, although in reality, some design work is carried out by specialist sub-consultants. Because the designers and builders work together, the design effort can be substantially reduced. It is not necessary to prepare drawings in great detail if the builder already understands the scope of work. Time is saved by using a fast track module. For instance, the design-build Contractor can begin construction of early phases of the project (e.g. grading, site utilities, foundations) before design of later phases (building envelope, interior partitions, HVAC, electrical) are fully completed.

The concept behind design and build assumes liability for design where the Contractor takes relatively a wide mandate when interpreting the Employer's requirements. Although it is incumbent on the Contractor to engage a design team to come up with a design that compiles with the Employer's requirements, the Employer may find that he still has to engage his own consultants for technical guidance. Also, a Contractor's perception of liability assumed for design could be much wider than anticipated.

Sometimes, a design-build contract is awarded after a design competition. The winning design is usually chosen by an independent panel of design professionals and stakeholders. This procedure is often used to generate new ideas for the building design, to stimulate public debate, to generate publicity for the project and allow emerging designers the opportunity of gaining exposure. Award shall be made to the design-build entity whose proposal is judged as providing the best value in meeting the interest of the Employer. Best value may include price, features, functions, and life-cycle costs. Design-build has the potential to reduce over-all project cost because the design-cost optimisation undertaken along with the progress. The design-build entity has an incentive to use the optimum amount of engineering. A botanic park for example consists of both green and brown elements starting from horticulture to bio technology. A design competition would help stakeholders understand the pros and cons that are likely to evolve during the project implementation.

Design-build eliminates the liability gap also. Design professionals can obtain insurance coverage only for negligent errors and omissions, and virtually all design contracts limit the designer's liability to such. However, there can be non-negligent errors and omissions, which cost the Employer more money but for which the design professional is not liable. For example, a design professional may undertake reasonable subsurface investigations but fail to detect a boulder that will require additional costs to deal with.

Virtually all design and build contracts place full responsibility for design on the Contractor. It is submitted however that such provisions only operate if 'full' design is undertaken by them; otherwise the Employer will be liable for the detailed design. It is therefore essential, that Employers in design and build type contracts adopt more of a back-seat approach by placing some reliance in their Contractors and allowing a sufficient room to implement the end product, that is fit for its purpose.

Basically, the D&B approach promotes object oriented design towards the primary objective of system engineering where the timely integration of all system elements has been ensured from the beginning. This can be accomplished only in a good definition of requirements of the Employer followed by a structured and disciplined approach to design.

2.3.1 Modularity

As in the automotive and major appliance industries, modularity is becoming a strong force in the construction sector. The concept of modular design is very practical where hundreds of modular building blocks can be assembled off-site. This reduces on-site congestion, enhances productivity and allows standardization of the processes and equipment deployed in the production. Modular design further brings advantage of work force familiarity in the job reducing unnecessary waste of time and energy. Modular design concept enhances buildability when components and sub assemblies are related to each other according to a set of geometrically and dimensionally coordinated principles.

Design-Build works smooth when using standard designs that have been built repeatedly. It is absolutely critical that the Employer and builder have the same clear picture of the final project before construction begins. The benefits are therefore said to be single or one package, single communication channel, design economy and flexibility, few claims by Contractors, no design liability for the Employer and so forth.

2.4 Design, build and operate

FIDIC has taken an initiative to produce a standard form on Design, Build and Operate (DBO). As the title suggests, the contract is intended to govern the relationship between the Employer and the Contractor involved in progression of a multidisciplinary contract: to design, build and operate as opposed to individual agreements to govern the different facets of a project, that is design, construction, testing, commissioning etc as usually come across. The Contractor in this modality is a consortium by composition specifically set up to reflect the interests, roles, obligations and liabilities of the parties. Each party will have a specific input into the consortium such as funding, design, construction, operation, management and maintenance. The extent of their inputs depends on the nature of the project and the terms entered into with the sponsor of the project i.e. the Employer.

Generally DBO operates on a cost plus profit orientation, intended for a long term business function in line with the return on capital investment.

The combination of a number of disciplines and their reliance on a consortium has its obvious advantages of saving time, sharing know-how and simplifying contract administration. It is ideal in cases where the Contractor will be the most suited to operate and maintain the facility it has designed and built. In this respect, it is in the interest of the contract to produce a low maintenance quality design and operation given its long term commitment to operate the project on completion. It mutually serves the Employer's interests of having a quality built and designed low cost maintenance project. Desalination plants, storm sewer projects and garbage disposal projects are couple of examples to operate on DBO basis.

2.4.1 Green design

DBO approach is also based on the concept of green design. Green design is a step aiming to produce, products and services in a way that reduces the use of non renewable resources, minimizes environmental impact, and relates people with the natural environment. Often viewed as a necessary tool for achieving sustainability, green design is a reaction to the global environmental crisis also, i.e., rapid growth of economic activity and human population, depletion of natural resources, damage to ecosystems and loss of biodiversity. Proponents of green design believe that the crisis is in large part caused by conventional design and industrial practices, which disregard the risks and environmental impacts associated with goods and services. Green design is considered a means of reducing or eliminating these impacts while maintaining quality life by using careful assessment and clever design to substitute less harmful products and processes for conventional ones.

Here the focus is for the project to work in harmony with the natural features and resources surrounding it, and to use materials that are sustainably grown or recycled rather than new materials from non-renewable resources. Architectural salvage and reclaimed materials are used when appropriate as well. When older buildings are demolished, frequently any good wood is reclaimed, renewed, and sold as flooring. Many other parts are reused as well, such as doors, windows and hardware, thus reducing the consumption of new goods. When new materials are employed, green designers look for materials that are rapidly replenished, such as bamboo, which can be harvested for commercial use after only 6 years of growth, or cork oak, in which only the outer bark is removed for use, thus preserving the tree.

2.5 Management contracting

The Employer engages a management Contractor on a fee basis as equal member of the team, to plan, organize, co-ordinate and control the whole project. Usually two or three management Contractors will be invited to make proposals with a complete method statement and associated cost. The management Contractor is to undertake the contractual, technical and commercial responsibility for the construction of the project alone with works-Contractors. The management Contractor does none of the construction works himself but they are divided into work packages which are sub-let to works-Contractors, each of whom enters into a contract with the management Contractor.

As such, the works are let competitively by the management Contractor to sub Contractors and specialists in appropriate works packages. This approach often means that design and the start on site overlap, with the design and tender packages becoming available 'just-in-time' to suit the construction programme.

Management contracting therefore operates in a system that is significantly different from the conventional approach. The management organisation does not normally execute any of the permanent works as mentioned, but may sometimes provide common user and service facilities. Under this modality, the operational control of a construction project is vested by contract to perform the necessary managerial functions. It could be a wide range of functions, such as technical operation of a recycling plant, management of personnel, accounting, marketing services and training. This preserves the management Contractor's independence and reinforces consultancy relationship with the Employer than any other method. Management contracting is therefore more closely related to a professional service than to a normal construction contract. Payment is usually made to the management Contractor on the basis of the cost of the works packages plus an agreed fee.

Management contracting is suitable for large scale fast track projects of complex nature, for instance a hotel complex project having more than 60 separate work packages, but not for inexperienced Employers, who want to pass their risk to the Contractor. There is less price certainty at the outset, because construction tends to start ahead of completion of all design stages and at a point when many of the work packages have yet to be tendered. This often means unless adjustments are made to the design and specification of works packages later in the programme, there will be a budget overrun.

The JCT model is instrumental in the concept of management contracting. As articulated, the management Contractor does not carry out any construction work himself. Instead, he assists the Employer in putting together works packages for tender and then enters into, and manages, the works contracts. The procedure is thus two-stage. Although a MC model has a taste of a 'cost plus' in payments, a schedule is included within 'prime cost' in work contracts. In the meantime, the parties can be allowed to use fixed or capped rates instead of prime cost.

The management Contractor cannot give extensions of time under a works contract without consulting with the Engineer about his proposed decision; nor can he certify completion of a works contract without the Engineer's consent. Loss and expense claims from works Contractors are ascertained by the Engineer in conjunction with the management Contractor.

Management contracting is appropriate for large Employer-designed projects where full design information is not available, but where an early start on site is needed. However, the JCT form of management contracting gives the Employer a reasonable amount of protection and control in the overall project delivery. This system of procurement is different from construction management, where the Employer engages trade Contractors directly.

2.6 Performance based contracting

Performance based contracting (PBC) is a technique where the key success factors (KSFs) are identified and the performance of which is ensured and measured through a scheme of rewards and penalties. Based on the performance parameters, that are customised on specific project requirements, the Contractor would have the single-point responsibility for designing, constructing, operating and periodically maintaining the plant. The evaluation criterion ensures that all parameters having a bearing on the plant's long-term life cycle cost for instance were identified and factored in.

These contracts provide for performance incentives and penalties on critical parameters. For example the contract for construction of terminals in major ports specifies a minimum guaranteed traffic, which the terminal Employer has to commit. The minimum guaranteed traffic ensures that the major port recovers not only its investment in the waterside and linkage infrastructure but also its opportunity cost of development. In power generation projects, the Employer is incentivised to increase the plant load factor (PLF) so that the fixed cost can be amortised over a larger number of units, conversely there are penalties for operation below a certain PLF. This is because the state subsidises the power cost and reduction in PLF would increase the subsidy amount. Hence, PBC is a powerful contracting technique, which can ensure the Contractor's performance on critical parameters through penalties and incentives, ensuring that maximum benefits are derived from the investment. These could be in form of project design, construction time, operations and maintenance cost and overall life cycle cost.

2.7 Private finance initiative (PFI)

The thinking behind this initiative is that the private sector is better than the public sector in project management. This ranges from just building, to build-own (BO), to build-own-operate (BOO), to build-own-operate-transfer (BOOT) and design-build-fund-operate (DBFO). PFI builds on these approaches using the private sector inputs in the total project delivery.

The objective is also the sharing of financial risk with the private sector and bringing commercial reality to large complex projects. The potential risks of procuring, operating and maintaining are passed onto the private sector, leaving the public service to run its core business. The intention is that the economies of scale achieved by the service providers are passed onto customers in terms of lower overall costs.

In PFI, a Contractor responds to an Employer's brief and offers a package to provide and run a building for a number of years in exchange for a 'rent'. At the end of the period, the ownership of the building reverts to the Employer. The Contractor will often form a separate company made up of the bidding parties' designer, builder, operator, and banker in order to protect their core business from the risk of going wrong.

Although PFI has been designed for public sector procurement, it is based on private sector initiative of BOOT. The approach recognises that the procurement does not stop at the completion of the construction work, but over the life of the building. Arguably, the single reason for the growth in private finance initiatives is the consequent reduction in government expenditure on infrastructure needs. Other advantages are that private investors take most of the commercial risks, they raise finance thus enabling the project to proceed, and the quality of the product can be higher since the private sector has an interest in the project long after the work has been completed.

2.8 Partnering contracts

Partnering is a structured management approach to facilitate team work across contractual boundaries. Its fundamental components are mutual objectives, collective efforts and continuing measurable improvements. Construction partnering is a commitment between the Employer, consulting Engineer and/or architect, and the Contractor(s) to improve communications and avoid disputes by working together towards shared and common goals on specific project basis.

Partnering builds goodwill and trust, encourages open communication, and helps the parties eliminate their adversarial positions. It enables the parties to anticipate and resolve problems, and avoid or minimize disputes through informal ways. However, the benefits of formally partnering a construction project increase with the projects' increased risk. The risk can be evaluated in terms of design and construction complexity, the number of stakeholders involved, budget constraints, and many other factors.

Partnering is not negotiated contracts or preferred supplier arrangements, all of which lack the structure and objective measures that must support a partnering relationship. It is the commitment of all partners at all levels to make the project a success. The result is that the partnering agreement drives the relationship between the parties. Hence, partnering is only appropriate amongst those who share the fundamental belief that the people are motivated by challenge. It therefore enables organisations to set up mutually advantageous commercial arrangements, either for single projects or in long-term strategic relationships.

The benefits are generally cumulative if partnering is applied throughout the supply chain, rather than simply between Employers and main Contractors. When considering partnering arrangements, parties should identify sources of risk and then establish who can best manage the risk. It runs on open book policy where the parties have access to a common data base maintained in a transparent manner.

2.9 Prime contracting

The Employer provides the prime Contractor with a general statement of his objectives. The prime Contractor is responsible for outline and detailed design and construction and may also provide some services after completion. The broad scope of the prime Contractor's responsibilities inevitably means that Employer's control is considerably low.

Payment to the prime Contractor is assessed on a target price basis and he shares any pain or gain to the extent that actual costs are above or below the target price. If costs exceed a maximum target price, then the prime Contractor is responsible for the whole of the cost overrun above that figure. The potential financial risk is considerable although much will depend upon how the levels at which the target cost and maximum target cost have been agreed.

It is not intended that the prime Contractor will carry out more than a small proportion of the work himself. Much of it will be performed by his supply chain. Hence, the core skill of the Contractor is that of managing that supply chain. Therefore, the prime Contractor will address the supply chain in clusters responsible for different elements of the project. If the prime Contractor is to succeed, he must draw value from the supply chain in order to drive down the costs of both construction and operation while maintaining or enhancing quality. Key members of the supply chain should therefore be involved in the design process much earlier than has been customary. The very considerable risks imposed need to be distributed among those in the supply chain best able to deal with them.

2.10 Schedule contracts

Schedule contracts have been used when the detail of the work to be done are too scanty to permit the preparation of a precise specification or an accurate bill of quantities at the tender stage. The schedule lists major items of cost significance and the Contractors tender by inserting a rate against each item. More often in public service and maintenance sector, there may be standard rates included in the schedule in which case the Contractors tender by quoting a percentage on or off the standard rates. In the case of 'ad-hoc' schedules, it is usual to give the approximate quantities in order to gain a probable cost.

The work is measured on completion and the actual cost is known only at the completion although approximate quantities have been estimated for the Employer to have a rough idea as to the likely financial commitment.

2.11 Serial and continuation contracting

Serial contracting works on standing offers whereby a Contractor undertakes a series of lump sum contracts in accordance with the terms and conditions set out in the initial offer. The offer usually relates to a firm programme of specific jobs of a similar nature. The prices in the offer may be presented in the form of a 'notional' bill of quantities prepared to provide a competitive base for the selection of the Contractor and the subsequent negotiations of a tender. The standing offer is usually taken up by means of a letter of intent which should make clear that the number of contracts let within the framework of the offer will depend upon satisfactory performance on the part of the Contractor and that the individual offers must be acceptable to the Employer in respect of quantity, quality, cost and completion time.

The system usually offers an incentive to firms capable of maintaining a high standard of workmanship and savings in time by eliminating lengthy pre-contract procedures for each and every project. It also enables skilled production gangs to be kept, together for future projects that require similar experience.

Sometimes referred to as 'extension' contracts, continuation contracts arise where it is desired to place a further contract or contracts based on the terms of an existing contract in order to obtain the benefits which arise from continuity of work. The continuation contract(s) are therefore negotiated on the basis of the original contract. However, any 'ad-hoc' arrangement is less likely to produce all the benefits to be gained from the forward planning. The object is to avoid the practical difficulties of having two Contractors working on the same site concurrently.

2.12 Cost plus versions

Sometimes called cost reimbursement contract, the cost-plus contract allows a Contractor to be paid in full for all expenses allowed up to a set limit that is defined in the terms and conditions. In addition, the Contractor may also receive additional amount as a profit earned on the job.

The provisions of the cost-plus contract are different from those associated with the fixed-price contract. With the latter, the Contractor commits to only charging a specific amount for the job as outlined in the agreement. Should the actual expenses exceed the costs associated with fulfilling the obligations made in the agreement, the Contractor cannot pass those costs on to the Employer. Instead, the Contractor must absorb those costs, which may result in a loss on the project.

A cost plus fixed fee contract allows the Contractor to collect a fixed amount of compensation at a specified time during the project. In a cost plus contract the Contractor's profit is set at a fixed amount. If actual costs are lower than the estimate, the Employer keeps the savings. If actual costs are higher than the estimate, the Employer must pay the additional amount. The great advantage of a cost plus contract is that, generally speaking, the project will result in the building that was envisioned, even if costs run high. The builder is less likely to use less expensive materials because his profit is not in jeopardy. Also, the builder has little incentive to keep the Employer's costs down.

The cost-plus-incentive fee contract is another form where the Contractor receives a fee for saving money on materials or labour associated with fulfilling the terms of the agreement. However, a larger fee can sometimes offset the savings. A cost plus award fee arrangement is a type of cost-plus contract that will award a bonus if the Contractor demonstrates performance that is considered to be proficient that envisioned in the contract. A cost-plus-percentage of cost agreement makes it possible for the Contractor to adjust charges for materials upward in the event that the market price for those materials increases. This is one of the least favourable forms of the cost-plus agreement, since it provides no incentive at all for the Contractor to keep expenses within the range originally defined in the agreement.

For certain types of construction involving new technology, the Employer is sometimes forced to assume risks of cost overruns. The Contractor will receive the actual direct job cost plus a fixed percentage, and have little incentive to reduce the job cost. Furthermore, if there are pressing needs to complete the project, overtime payments to workers are common and will further increase the job cost. Unless there are compelling reasons, such as the urgency in military installations, the Employer should not use this type of contract.

Cost-plus contracts generally do not provide any motivation for the Contractor to monitor costs closely. However, if quality rather than price is the main objective of the Employer, a cost-plus mode of contract is likely to be the best option. Hence these contracts are appropriate in open-ended emergency situations such as structural collapse or damage and it is absolutely necessary to start the work before its character and scope can be determined, and in circumstances where the works are exposed to conditions of great uncertainty or unquantifiable risks, such as unknown ground conditions. They are also suitable when an early start is required on contracts which are not completely defined but are expected to be highly remunerative, such as hotels, innovative processing and manufacturing plants, etc.

In cost plus variable percentage contract, the Contractor agrees to a penalty if the actual cost exceeds the estimated job cost, or a reward if the actual cost is below the estimated job cost. In return for taking the risk on its own estimate, the Contractor is allowed a variable percentage of the direct job-cost for its fee. Furthermore, the project duration is usually specified and the Contractor must abide by the deadline for completion. This type of contract allocates considerable risk for cost overruns to the Employer, but also provides incentives to Contractors to reduce costs as much as possible.

2.13 Turnkey

In the turnkey or package deal contract, both detailed design and construction are undertaken by one organisation although parts of the design may be subcontracted to specialist consultants. The Contractor carries most of the design and construction risks.

Hence, the scope of a turnkey contract is wider than that of a traditional contract. The turnkey Contractor undertakes to provide detailed designs, production process of plant and equipment, related construction, licenses, guarantees, training of operating staff, commissioning, initial operation, and final hand-over of the 'key' to the Employer for him to 'turn'. The contract price is normally quoted lump sum with periodic payments against specific stages of completion. Turnkey contracting is used for the procurement of complex industrial process plants, such as steel mills, food processing, coal bunkering, petroleum refineries, etc because turnkey is flexible in catering alternative systems and processes.

It would therefore be undesirable to prepare definitive designs and complete technical specifications in advance. A two stage bidding procedure is normally followed, first inviting un-priced technical proposals and outline designs which are subject to clarification and adjustment by the Employer, followed by a submission of detailed technical proposal and priced bids in the second stage.

2.14 Construction management

Construction Management is a method in which the Employer hires a construction professional early in the design phase. The construction manager works with the design team to help ensure that the design is something that can in fact be built for a reasonable cost and that the builders will be able to understand the design drawings and specifications. This can result in a reduction of the total design effort similar to what occurs in design and build. There are two basic types of construction management: construction manager as advisor and construction manager at risk. In the construction manager as advisor variation, the construction manager acts as technical consultant to the Employer and has no legal responsibility for the performance of the actual construction work.

In the construction manager at risk variation, the construction manager becomes the prime Contractor during the construction phase and awards sub-contracts much like a general Contractor in a design-bid-build project. Construction management projects are most frequently done through a guaranteed maximum price contract, but other types may also be used.

The great advantage of construction management is its emphasis on teamwork, and the fact that a builder is involved in the design and decision making process almost from the start. Another advantage is that the Employer can often be more involved in the selection of sub-Contractors if so desired. The disadvantages of construction management are that there may be some blurring of the lines of responsibility, and that the Employer should expect to have more meetings requiring attendance.

The basic difference between a construction manager and a general Contractor is in their approach to managing sub-Contractors and in keeping the Employer's costs down. A true construction manager, whose fee is not affected by the result, will attempt to negotiate the best value for the Employer in selecting sub-Contractors. A general Contractor will tend to negotiate in a way that maximizes his profit.

Sometimes, a firm of consultancy is appointed by the Employer to access managerial inputs in the total delivery of the project within cost, time and quality parameters. This is basically management consultancy engaged in advisory and supervisory role, depending on what has been contracted for in a particular project. Management consultancy eases out Employer headaches in mega projects including managing technical and human resources, at an agreed fee.

2.15 EPC form

EPC stands for Engineering, Procurement and Construction. Under an EPC contract, the Contractor will design the installation, procure the necessary materials and construct, either through own labour or by subcontracting. The Contractor carries the project risk for schedule as well as budget in return for a fixed price depending on the agreed scope of work.

The EPC Contractor agrees to deliver the keys of a commissioned plant to the Employer, just as a builder hands over the keys of a flat to the purchaser. An Employer decides for an EPC contract for several reasons. Amongst them are the Employer puts in minimum efforts for his project. EPC gives the Employer one point contact. It is easy to monitor and coordinate; and for the Employer to get post-commissioning services. EPC ensures quality and reduces practical issues faced in other ways; and quite often the Employer is not affected by the market rise.

2.15.1 Life cycle costing

EPC is an ideal forum to apply the principle of life cycle costing. LCC is the total cost of ownership of a product, structure, or system over its useful life. There are two reasons to do an LCC analysis: 1) to compare different options and 2) to determine the most cost-effective system designs. An LCC analysis can be helpful in comparing costs of different designs and/or determining whether a hybrid system would be a cost-effective option. It allows the designer to study the effect of using different components with different reliabilities and lifetimes. For instance, a less expensive battery might be expected to last 4 years while a more expensive battery might last 7 years. Which battery is the best to buy? This type of question can be answered with an LCC analysis.

Some might want to compare the cost of different power supply options such as photovoltaic fueled generators or extending utility power lines. The initial costs of these options will be different as will the costs of operation, maintenance, and repair or replacement. A LCC analysis can help compare the power supply options. The LCC analysis consists of finding the present worth of any expense expected to occur over a reasonable life of the system. To be included in the LCC analysis, any item must be assigned a cost, even though there are considerations to which a monetary value is not easily attached. For instance, the cost of a gallon of diesel fuel may be known; the cost of storing the fuel at the site may be estimated with reasonable confidence; but the cost of pollution caused by the generator may require an educated guess.

The life-cycle cost of a project can be calculated using the formula; $LCC = C + Mpw + E\ pw + R\ pw - S\ pw$, where the pw subscript indicates the present worth of each factor.

- The capital cost (C) of a project includes the initial capital expense for equipment, the system design, engineering, and installation. This cost is always considered as a single payment occurring in the initial year of the project, regardless of how the project is financed.
- Maintenance (M) is the sum of all yearly scheduled operation and maintenance (O&M) costs. Fuel or equipment replacement costs are not included. O&M costs include such items as an operator's salary, inspections, insurance, property tax, and all scheduled maintenance.
- The energy cost (E) of a system is the sum of the yearly fuel cost. Energy cost is calculated separately from operation and maintenance costs, so that differential fuel inflation rates may be used.
- Replacement cost (R) is the sum of all repair and equipment replacement cost anticipated over the life of the system. The replacement of a battery is a good example of such a cost that may occur once or twice during the life of a PV system. Normally, these costs occur in specific years and the entire cost is included in those years.
- The salvage value (S) of a system is its net worth in the final year of the life-cycle period. It is common practice to assign a salvage value of 20 percent of original cost for mechanical equipment that can be moved. This rate can be modified depending on other factors such as obsolescence and condition of equipment.

Future costs must be discounted because of the time value of money. One dollar received today is worth more than the promise of $1 next year, because the $1 today can be invested and earn interest. Future sums of money must also be discounted because of the inherent risk of future events not occurring as planned. Several factors should be considered when the period for an LCC analysis is chosen.

2.15.2 Design to cost

EPC also promotes design to cost (DTC) in highly sophisticated product installations, forming the most significant portion of the total project cost. Effective product cost management requires a design to cost philosophy as its basis since a substantial portion of the product's cost is dictated by decisions regarding its design. Design to cost is a management strategy and supporting methodologies to achieve an affordable product by treating target cost as an independent design parameter that needs to be achieved during the development of a product. A design to cost approach consists of the following elements:

a. An understanding of customer affordability or competitive pricing requirements by the key participants in the development process;
b. Establishment and allocation of target costs down to a level of the hardware where costs can be effectively managed;
c. Commitment by development personnel to development budgets and target costs;
d. Stability and management of requirements to balance requirements with affordability and to avoid creeping elegance;
e. An understanding of the product's cost drivers and consideration of cost drivers in establishing product specifications and in focusing attention on cost reduction;
f. Product cost models and life cycle cost models to project costs early in the development cycle to support decision-making;
g. Active consideration of costs during development as an important design parameter appropriately weighted with other decision parameters;
h. Creative exploration of concept and design alternatives as a basis for developing lower cost design approaches;
i. Access to cost data to support this process and empower development team members;
j. Use of value analysis / function analysis and its derivatives (e.g., function analysis) to understand essential product functions

and to identify functions with a high cost to function ratio for further cost reduction;

k. Application of design for producibility principles as a key cost reduction tactic;
l. Meaningful cost accounting systems using cost techniques such as activity-based costing to provide improved cost data;
m. Consistency of accounting methods between cost systems and product cost models as well as periodic validation of product cost models; and
n. Continuous improvement through value engineering to improve product value over the longer term.

In the absence of product cost models and product development teams, each functional organization will make decisions from their own perspective, trying to manage the elements of cost that they are responsible. For example, decisions to minimize non-recurring design engineering expenditures may result in a less producible product, driving up material and labor costs in manufacturing. Decisions to minimize tooling capital expenditures may also have the same effect in manufacturing costs. Test engineering may try to minimize its non-recurring development budgets and capital expenditures resulting in a less automated test process and higher recurring test costs for production verification.

Product development teams provide the organizational mechanism to bring the various disciplines together to optimize product costs from an enterprise perspective. Cost models provide the means for the team to objectively consider the implications of various development decisions. A company operating philosophy that emphasizes cost as a factor in the development decision-making process is a final requirement.

Access to product cost projections early in the system life cycle will improve decision-making about design alternatives and lead to refinement of the design to come closer to the established cost targets. These costs projections will aid decisions about the design of the manufacturing process as well, focusing attention of elements of the product costs that do not meet the target and allowing consideration of alternative processes while it is still early enough in the development cycle to introduce new processes. The design alternatives carry different technical performance measures, TPMs. The key is to emphasize management of product costs during development, not merely accumulating costs as designs are completed giving due regard to the TPM s involved.

2.15.3 EPC in oil and gas sector

There are a number of contractual approaches that can be taken to construct an oil and gas facility. An EPC contract is one approach. Another option is to have a supply contract, a design agreement and construction contract with or without a project management agreement. The project management can be, and often is, carried out by the proponent itself. The choice of contracting approach will depend on a number of factors including the time available, the lender's requirements, and the sophistication of the proponent and the identity of the Contractor. The major advantage of the EPC contract is the single point of responsibility. In these cases the EPC Contractor is required to be a large, experienced participant in the industry who the sponsors and lenders are confident can successfully deliver the project and is large enough to cope with losses if it does not. Further, companies with a successful track record mean that insurance for the project is inborn. Employers will still use an EPC contract or design and construct contract for parts of large projects even if self management or project management are used to an extent. EPC contracts are popular in oil and gas sector because of a fixed completion date, a fixed completion price, limited technology risk, output guarantees, liquidated damages for delays, security from the Contractor and its parent, large caps on liability and restrictions on the ability of the Contractor to claim extensions of time and additional costs.

2.16 Target cost and schedule contracts

An Employer may introduce additional incentives into a contract by offering the Contractor a bonus payment for the achievement of some previously defined targets in terms of time, cost or performance. A Contractor may earn a bonus for timely or early completion of the whole or some section of the works, in addition to the payments related to work completed. The achievement of key intermediate completion dates is particularly important in projects that involve a number of different Contractors in the sequential installation and commissioning of process or manufacturing plant. A series of increasing bonuses tied to a sequence of key dates has been found to be a particularly successful form of incentive in target contracts.

A target cost contract is a 'cost reimbursable plus incentive fee' type of contract where the fee is adjusted with bonus or penalty according to whether the final contract cost is less or greater than an agreed target cost. The contract specifies a penalty or reward to a Contractor, depending on whether the actual cost is greater than or less than the Contractor's estimated direct job cost. Usually, the percentages of savings or overrun to be shared by the Employer and the Contractor are predetermined and the project duration is specified in the contract. Bonuses or penalties may be stipulated for different project completion dates.

An Initial Target Cost (1TC) can be the subject of competitive bidding on a unit rate basis against provisionally estimated quantities of work, with overheads and fee priced separately but competitively, the 1TC is updated periodically to include agreed variations, extra works, actual and estimated quantities of work and price adjustment (if any), and becomes the Final Target Cost (FTC) upon completion. Payment to the Contractor is made on a reimbursable basis against actual inputs to the contract and, upon completion; total payments are compared with the FTC to determine the amount of final fee.

2.17 Build, operate, transfer (BOT) contracts

The BOT type of contract may be considered when an Employer has a limited budget and borrowing capacity. It is essentially a concessionary turnkey type contract, including financing in addition to the design, construction, operation and maintenance. Typically, projects on BOT basis are public and private revenue earning projects such as power generation and distribution, toll roads and bridges, water supply, etc. Normally, total costs and risks are borne by the private BOT investors over the concession period. The source of revenue to the BOT investors is the tariff levied on users of the facility, which is a major consideration in bid evaluation.

The BOT stands for 'Build, Operate and Transfer' or 'Build, Own and Transfer' (the terms are used interchangeably). Other variants include: BOOT (Build, Own, Operate and Transfer); BOO (Build, Own and Operate, i.e., without any obligation to transfer); BRT/BLT (Build, Rent or Lease and Transfer); BOOST (Build, Own, Operate, subsidize and Transfer); BT (Build and Transfer immediately, possibly subject to instalment payments of the purchase price in the future); and MOT (Modernize Operate and Transfer). A BOOT funding model involves a single organisation, or consortium (BOOT provider) designing, building, funding, owning and operating the scheme for a defined period of time and then transferring this ownership across to an agreed party.

2.18 Lump sum contracts

The Contractor agrees to execute the work for an agreed sum based on information derived from drawings, specifications, bills of quantities, etc. The method presupposes that there is sufficient information available at the time of tendering to assess accurately the scope of the work involved. Small areas of uncertainty may be left to the Contractor to assess the risk or may be covered by the inclusion of a provisional sum. However, whilst isolated provisional sums are admissible for minor items, a disproportionate number of such sums would completely destroy the primary advantage of this type of contract, i.e. knowledge by the Employer of his likely financial commitment. Such contracts must contain a 'fluctuation' clause which makes a provision for the contract sum to be adjusted if labour rates or material prices change during the progress. This provision is usually insisted upon by Contractors when prices are not capable of being predicted over a long contract period.

Strictly speaking, a lump-sum contract is one in which a stated sum is totally paid at the completion of whole of works. This is operable for both very minor and major works but it is usually necessary to make provision for variations in the work. These modifications alone may suffice for contracts when it becomes increasingly difficult to define the exact scope of work in advance.

Lump sum contracts are however ideal for small, short duration, well defined and detailed works, which are not subject to large quantity variations or conditions of high risk. Possible examples are standard culverts and small bridges, small health buildings, standard housing, bus shelters, etc when contract prices would normally lie within a small tolerance. Lump sum contracts may sometimes be suitable for special works of longer duration, such as industrial plants such as switchgear, ducting etc where composite items are involved, following a two-step bidding procedure with designs prepared by successful bidder.

Lump sum contracts are frequently used by Employers in an attempt to limit or define the amount that they pay for the work. However, the reality is that the lump sum amount provided by the Contractor is not the final price the Employer may pay. To explain this, a Contractor will be asked to provide a lump sum price for a quantum of work that is considered by the Employer to be well defined. A schedule of prices may be included in the contract documents and is used to determine progress payments and for valuing variations. If the actual cost of the project is underestimated, the underestimated cost will reduce the Contractor's profit by that amount. An overestimate has an opposite effect, but may reduce the chance of being the lowest in tendering.

It is also possible to let a contract on a lump sum basis for such work as jetties, when the piling and dredging would be made provisional since they could not be determined precisely in advance. Similarly, in the case of highway contracts there would seem to be no reason why the carriageway should be subject to re-measurement and in many cases structures can be fully designed and accurately measured and billed, without re-measurement.

In a pure lump sum contract, the Contractor undertakes to carry out a defined amount of work in return for an agreed fixed price. This is called a fixed price contract where the sum named in the letter of acceptance shall remain unaltered and where the quantities are taken to have actual and correct and any error in the quantities shall not be corrected. But in many instances the price is paid in stages, which may be subject to adjustment on the effect of any variations, any provisional sum, prime cost sum etc as stated in the Contract. In a manner, re-measurement has been disguised in lump sum contracts.

Lump sum contracts with bills of quantities are priced on the basis of drawings and specifications. Any item or section of work which cannot be accurately measured is covered by a provisional quantity or sum and measured as executed on completion of the item or section of work i.e. the value of the provisional items or sections of work in the bills are deducted from the contract sum and the value of the actual work executed are added.

For example, the whole of the substructure and much of the external works may be described as provisional and are re-measured as done. This does not prevent the contract from being described and treated as lump sum of a substantial part of the works can be measured accurately for inclusion in the bills. Lump sum contracts are therefore ideal in cases where the exact scope of work is known and definable in actual quantities at the tender. The provisional quantities are however included in the bills when the exact scope is unknown or indefinable. Individual items to be re-measured can be mixed in with the 'firm' items, or a whole section can be shown separately and described as provisional. It is very important to clearly differentiate items of work that are not measured firm, by marking each item (or group of items) 'provisional' and explaining the process of adjustment elsewhere in the contract. (e.g. in the preliminaries/preambles) The provisional quantities can therefore be dealt with in the same way as estimated quantities in a typical re-measurement contract.

2.19 UR Contracting

The unit rate (UR) type of contract, often called measure and pay type, is the most common in construction projects, both large and small. Bidders are invited to quote unit rates for carrying out the Employer's estimated quantities of different classes of work. The unit rates are inclusive of all related inputs (labour, material, equipment usage and a proportion of overheads and profits). The bid price comprises the summation of estimated quantities multiplied by the respective unit rate for all the items of work. During the contract execution, quantities of work completed satisfactorily are measured periodically as a basis of payment. The unit rate may be fixed for short duration contracts or adjustable for variation in the indexed price of inputs over longer duration contracts.

In UR contracting, the bidders are competing on the most equitable basis, against the same quantities of work and completed designs and the competition and evaluation of bids is normally straight forward and objective. It also provides flexibility in handling variations and regular payments.

In a unit price contract, some Contractors may submit 'unbalanced bids' when they discover large discrepancies on quantities. Depending on the propensity on risk, a Contractor can slightly raise the unit prices on the underestimated tasks while lowering the unit prices on other tasks. If the Contractor is correct in its assessment, it can increase its profit substantially since the payment is made on the actual quantities of tasks; and if the reverse is true, it can lose on the same token. Furthermore, the Employer may disqualify a Contractor if the bid appears to be heavily unbalanced, or strategically manipulated for undue commercial advantage.

2.20 G-Max contracts

In a guaranteed maximum price (G-Max) contract, the Contractor estimates the cost just like in a lump sum bid, but profit is limited to a specified amount. In the event the actual costs are lower than the estimates, the Employer keeps the savings. In the event costs are higher, the Contractor pays the difference and profit is reduced. Sometimes, savings are shared between the Employer and the Contractor as an incentive to keep costs down. The G-Max will only apply to the work specified in the cost estimate. Changes, possibly the additional work which the Contractor agrees to perform, can result in a final payment that is higher than the G-Max.

The Contractor assumes the same risk on the stipulation that he is willing to share in the savings on the basis of Employer's guarantee of fee and prompt payment of net cost. There is no difference in cost or risk between lump sum and G-Max.

Still another advantage of G-Max occurs when work must start ahead of final drawings. There are often issues that delay completion of the drawings and therefore start of construction. The G-Max format allows Employers to minimize risk when proceeding with work while obtaining a G-Max price for the entire project based on preliminary drawings and outline specifications.

2.21 Direct contracting

Dealing with an Employer via an intermediate party in between can be frustrating, as all communication is second hand, and the Contractor has no direct contact with the client. In direct contracting, there is no intermediate margin to pay for. Right at the outset, the Contractor has much more control over the process. Employers prefer direct contracting because of time saving. Also direct contracting will be the only option in some cases, for instance whenever the user needs to get a supply and installation of an escalator done where the market is a monopoly. If it is an oligopoly, there will be a selective tendering depending on the time available.

In addition to time saving, direct contracting is ideal also when the Employer needs to retain control over the process, on security reasons, urgency of the job, and more reliability over the other competitors that has been built up over the previous projects. Direct contracts are often seen in military environments where the security and safety is top priority. The military characteristics are offensive, defensive, and logistical. Typical projects include wrapling towers for acrobatic training by commandos, pavilions, sports grounds, runaways, helipads, forward defence lines, barracks, ammo dumps, bunkers, sentry points, training establishments, fire ranges, detachments, as well as temporary structures such as Bailey bridges (portable pre-fabricated truss bridges with around 60 metre spans to carry tanks and heavy trucks). All these erections are on type designs strictly in accordance with standard military specifications.

2.22 Operation and maintenance contracts

Operation and maintenance (O&M) is an ongoing process of sustaining the performance of building systems according to design intent, the user's changing needs, and optimum efficiency levels. The idea of O&M as a process is to address the tenant comfort, equipment reliability, and uninterrupted trouble free operation. Efficient operation, in the context of O&M, refers to activities such as scheduling equipment, optimizing energy and comfort-control so that equipment operates only to the degree needed to fulfil its intended function. Maintenance activities involve physically inspecting and caring for equipment. These O&M tasks, when performed methodically, increase reliability, reduce equipment degradation, and sustain energy efficiency. O&M manuals provide the methodology to be adopted by the O&M Contractor and the O&M specification sets out the performance requirements to be maintained in the building or the plant.

O&M contracts are procured through annual tendering process, either competitive or selective, and basically they are service related such as in centrifugal chillers, boilers, air conditioners, lifts and other conveying machines, and large air compressors. Usually, an O&M contract is a full coverage contract the scope of which is full-labour, spare parts, training, preventive-maintenance, and inspection. There will be emergency attention packages also on call off basis. However, there can be many variations within a contract type, depending on the user needs so that the O&M Contractor customizes their service offerings. When repair and replacement coverage is part of the agreement, it is to the Contractor's advantage to perform rigorous preventive maintenance on schedule, since they must replace the equipment if it fails prematurely. Some contracts are only for preventive maintenance where the Contractor is to keep the equipment barely running so that these contracts are often included in the agreement along with the provision of minor materials such as belts, lubricants and filters.

The cost of emergency calls may be factored into the original contract, or the Contractor may agree to respond to an emergency within a set number of hours with the Employer paying for the emergency labour as a separate item.

2.23 Supply, installation and maintenance contracts

As the title implies, this type of contract provides for supply of major items of manufactured or prefabricated goods (such as turbines, pumps, generators, transmission towers, pipelines, boilers, etc) including relatively minor works involved in their erection or installation and commissioning. Minor works might be quoted lump sum basis on the design of the supplier, but major works are undertaken to the design of the Employer on a unit rate basis.

Pure maintenance contracts do not include the operation component. They are basically preventive-maintenance generally purchased for a fixed fee for a specified period. The entire contract runs on the assumption that maintenance is preventive on time-and-materials basis. However, the scope is not necessarily time related such as changing belts and filters, cleaning indoor and outdoor coils, lubricating motors and bearings, cleaning and maintaining cooling towers, testing control functions and calibration, and painting for corrosion control. Preventive maintenance (PM) is the care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection and correction of incipient failures either before they occur or before they develop into major defects.

It consists of regularly scheduled inspection, adjustments, cleaning, lubrication, parts replacement, calibration, and repair of components and equipment, which is however performed with no regard to equipment condition or (possibly) degree of use. PM schedules periodic inspection and maintenance at pre-defined intervals (intervals based on time, operating hours, or cycles) in an attempt to reduce equipment failures for susceptible equipment. Depending on the intervals set, PM can result in a significant increase in inspections and routine maintenance; however, it should also reduce the seriousness and frequency of unplanned machine failures for components with defined, age-related wear patterns.

Traditional PM is keyed to failure rates and times between failures. It assumes that these variables can be determined statistically, and that one can therefore replace a part that is due for failure shortly before it fails. The availability of statistical failure information tends to lead to fixed schedules for the overhaul of equipment or the replacement of parts subject to wear. PM is based on the assumption that the overhaul of machinery by disassembly and replacement of parts restores the machine to a like-new condition with no harmful side effects. In addition, this renewal task is based on the perception that new components are less likely to fail than old components of the same design.

Failure rate or its reciprocal, Mean-Time-Between-Failure (MTBF), is often used as a guide to establishing the interval at which the maintenance tasks should be performed. The major weakness in using these measurements to establish task priorities is that failure rate data determines only the average failure rate. The reality is that failures are equally likely to occur at random times and with a frequency unrelated to the average failure rate. Thus, selecting a specific time to conduct periodic maintenance for a component with a random failure pattern is difficult at best.

Generally, the Employer agrees to allow the Contractor to carry out all work of a certain type or falling within certain amount of cost for an agreed period. The work done is usually priced on either a schedule or a cost reimbursement basis although for larger jobs it may be advantageous to negotiate a lump sum. The main advantage in this type of term contracts is the price marginally lower in consideration of the continuity of work. At times, these contracts operate on call off basis where the payments are made on the actual allocation of resources in terms of hours and/or days, using a schedule of rates.

2.24 End-results contracting

This is where the Contractor takes over all of the operational risk for a particular end result, such as security, privacy, safety, and comfort. In this case, security is the service being exchanged for money. Safety is the service enabling accident free operation. Comfort is the end result the occupants entertain. The Employer and Contractor agree on a definition for these variables and a way to measure the results.

For example, comfort might be defined as maintaining the space temperature throughout the building from 18 Celsius for 95% of the annual occupied hours. The contract payment schedule is based on how well the Contractor achieves the agreed-upon objectives. This type of contracts may be appropriate for Employers who have sensitive customers or critical operational needs that depend on maintaining a certain level of security, safety, comfort, environmental quality etc, for an optimum price.

Another example is in air line sector where the cabin must maintain an optimum level of pressure for both safety and comfort. How risk is shared between the parties depends on the type or number of end results purchased. If comfort defined by dry-bulb temperature is the only end result required, then the Employer takes on the risk for ameliorating other problems such as indoor air quality, humidity, and energy use issues. These contracts are sometimes subject to penalty on the downtime.

Downtime refers to a period of time or a percentage of a time span that a machine or system (usually a computer server) is offline or not functioning, usually as a result of either system failure (such as a crash) or routine maintenance. Downtimes caused by system failures can have serious economic impact. In service level agreements, it is common to mention a percentage value (per month or per year) that is calculated by dividing the sum of all downtimes time spans by the total time of a reference time span (e.g. a month). 0% downtime means that the server was available all the time. For Internet servers downtimes above 1% per year or worse can be regarded as unacceptable as this means a downtime of more than 3 days per year. For e-commerce and other industrial use any value above 0.1% is usually considered unacceptable. Maximum contract price is tied to the amount and complexity of the end results purchased.

2.25 Outsourcing contracts

Outsourcing is the contracting out of a company's non core activities to any other firm of specialists in that non core activity. It is therefore a transference or delegation to an external service provider basically the operation and/or maintenance. Outsourcing logistics to a third party is another structural improvement in the supply chain. A firm can move some of its internal activities together with the authority of decision making pertaining to that particular activity to an outside organization. The terms of the agreement are established in an outsourcing contract where the resources that make up the activities such as people, facilities, technology, equipment and other assets are usually transferred with obligations to the extent as specified in the outsourcing contract. In the electronics industry for computers, for instance, nearly 11% of manufacturing is performed by such outsourced firms many of whom manage the full supply chain including distribution and repair.

Buying services from a provider is not necessarily outsourcing. Outsourcing always involves two way exchanges of information, coordination and trust. Many firms are interested in engaging expert organizations in the areas targeted for outsourcing which often include accounting, legal advice, real estate, information technology and related fields.

Outsourcing is characterized by expertise not inherent in the core of the client organization. For instance, a firm of construction consultancy reputable in architectural and engineering might outsource its function of quantity surveying to another firm who are reputable in the subject of quantity surveying to carry out bill of quantities and tender documentation. This is due to lack of experts or licensee to practice as Quantity Surveyors. Outsourcing is therefore sometimes inevitable because of technical and legal reasons.

A firm by outsourcing can yield the benefits of core competencies of a third party. Core competency is the ability to perform tasks in a more professional manner better than the competitors. Capabilities are considered core if they differentiate a firm strategically. The core competencies provide potential access to a wide variety of markets, increase perceived customer benefits and make harder for the competitors to compete with.

Efficiency is another deciding factor for outsourcing. Firms strongly believe that the best approach is to outsource the distribution tasks to a delivery service provider. A university geared towards distance learning can outsource its delivery of study materials to distance students using a courier service provider such as FedEx. A college can outsource its book supply to its external students via an online book supplier such as MBS Direct or Science Direct. The overall costs on customer services can be less when outsourcing is adopted in this way.

The topicality of outsourcing has also been accentuated in the high-tech market because individual firms are not large enough to be able to easily maintain large customer services department of their own. In some cases, these companies share technical writers to simplify the usage instructions of their products.

Product quality is another deciding factor for outsourcing. Some producers deliver their products to a firm professional in packaging (indeed a part of manufacturing process). This elongates however the supply chain in the interest of quality.

Outsourcing can also take place in demobilizing a large scale construction site which typically involves thousands of technical, commercial, legal and administrative records accumulated at the practical completion. A construction firm can outsource the activities related to demobilization including purging, coding, packing, delivering, storing and maintaining of records for a specified period of time. This also enhances easy access of information at any time, safe custody and restoration against termite attack in long run.

Outsourcing enhances effectiveness by focusing on what the firm does. A firm can focus its operations retained in-house on the basis of its competencies so that less attention is required on the outsourced elements. This creates a competitive advantage whilst reducing costs.

A firm may also refer to outsourcing where the time is of essence. A firm anticipates in e-tendering and entrusts fast track operations to a small firm due to pressure of time based competition limiting the in-house capacity of order fulfilment. Outsourcing can therefore be adopted as a competitive strategy in a more optimistic manner for large firms whose margin of profit can be refined to a smooth level. The reasons why a firm decides to outsource therefore vary greatly.

The benefits of outsourcing of course are variable, however, amongst the common reasons are the lower costs due to economies of scale, ability to concentrate on core functions, less dependency upon internal resources, ability to control delivery dates via penalty clauses, access to industry best practice and innovative ideas, gain market access and business opportunities and top of all, turning fixed costs into variable costs.

2.26 Sub letting

Sub letting reduces dependency on directly employed labour. It results non-wage cost of employment such as redundancy payment and offsets the risk associated with the responsibility by transferring them. Sub letting is necessary when to employ specialists of proven reliability and repute to face technical complexity in a project. There are two distinctly different modes of sub letting that everyone is known to; domestic and nominated.

Domestic subcontract is a direct contract between a sub-Contractor and the main Contractor where the sub Contractor is treated as an internal composition of the main Contractor for the purpose of responsibility. This is a form of letting sub-contracts whilst giving the Employer some choice where the main Contractor is given a list of names of sub-contract companies to whom he may go for that package of works. Usually, the Employer may reasonably expect the Contractor to progress the work on a domestic sub contract basis with one of the sub Contractors put forward by the main Contractor. The Contractor should be allowed to entertain the benefit of any pre-agreed rates and prices in their domestic sub contract without justifiable objection.

However, the (Main) Contractor shall not sub-let whole of the works. The 'subletting' clause further prohibits sub contracting any part of the work without the Engineer's consent, or unless the contract expressly permits. Engagement of labour on piecemeal basis is not a subletting by definition so that the Contractor does not require consent for provision of site labour. Regardless of any consent, the Contractor will be fully liable for the defaults of the sub Contractor as if they were the defaults of the Contractor himself. Sub contracting with the approval of the Engineer does not relieve the Contractor of any of his obligations and liabilities whatsoever, which *inter-alia* refers to quality, workmanship, time, cost and other obligations, whether express or implied. The general principle is that the Contractor is responsible for performance of his obligations and cannot excuse his breach by reference to having sub-contracted that part of his performance. This means that the Contractor is responsible for performance of all his obligations under the contract who may delegate performance but not responsibility.

Hence, the Contractor must ensure that the works are sub contracted on legal agreements binding the sub Contractor in all obligations under the main contract in so far as they are applicable to his part of work. The sub-contract is then intended to create a contractual relationship between parties, in order to allow the Contractor to perform part of his obligations under the main contract. Insofar as the sub-contract is intended to create legal relations, it is subject to the same principles which apply to the formation and operation of any contract. If a Contractor is to avoid introducing additional risk in sub-contracting the performance of his obligations under the contract, he must take an additional care to ensure that the terms of the sub-contract are consistent with those of the main contract.

If the Contractor does sub-contract part of the works without consent, then it may amount to a repudiatory breach of contract where the Employer will be discharged from further obligation under the contract including payment, since the Contractor's substituted performance will amount to non-performance. The Employer will also be entitled to damages for the repudiatory breach. This applies mutatis mutandis to the Contractor and sub-Contractor.

However, a case in which a local authority contract provided that, in the event of unauthorized subcontracting, the authority could either determine the Contractor's employment or claim £100 liquidated damages. When the Contractor breached this provision, the local authority gave notice of determination, engaged another Contractor to complete the work and then claimed against the original Contractor for the extra cost incurred (a total of some £21,000). However, it was held that, since the Contractor's breach would not have justified termination of the contract at common law, the local authority was limited to those remedies specifically given by the contract. These did not include unliquidated damages, and so the local authority's claim failed.

2.27 Nomination

Nomination is the process by which the Employer nominates, selects or approves a party who will perform a specialist trade role under a subcontract with the main Contractor. It is a means for the Employer to retain some control over the selection of specialist Contractor without directly involved in contractual arrangements with the specialist. The Employer is able to choose which company he wishes to use and that decision does not necessarily have to be based on price. The appointment of the sub-Contractor is left to the Employer to meet his requirements and does not depend merely because a provisional sum exists.

A reservation always exists where the Contractor may make an objection on reasonable grounds against entering into a nominated sub contract when the nominated sub Contractor refuses to accept the terms having a back to back effect (the like obligations and liabilities as are imposed on the Contractor towards the Employer by the terms of the main contract, except usually the payment terms). The objective of the sub contract is that the sub Contractor must discharge the obligations of the main Contractor insofar as they related to the works. These obligations will be both the primary one (the execution of the work) and the secondary one (the obligation to pay damages). Nevertheless, the Employer has no direct contractual relationship with the sub-Contractor as the sub-contract itself is still placed by the Contractor. This option may leave the unsuspecting Employer with no remedy against the sub-Contractor for default, and the risk of there being no recourse against the Contractor either. However, in the absence of express terms to the contrary the Employer may be able to place liability for the sub-Contractor's default on the Contractor, who had no choice in the appointment; an outcome which many would regard as unfair. This is why a tripartite agreement is always better than a bilateral one.

FIDIC recognizes that the failure of nominated sub Contractor to perform can have serious consequences for both the main Contractor and the Employer. Therefore, it is important to ensure that the main Contractor is prepared to collaborate with him. Thus, the main Contractor need not employ anyone against whom he has a reasonable objection; or who refuses to enter into a subcontract which: is back-to-back with the main contract; and which indemnifies the main Contractor in respect of nominated sub Contractor's breaches and against the negligence of his workmen and misuse of any temporary works. These rights of veto are crucial, and Contractors generally must not feel reluctant to exercise those rights. Thus, the main Contractor can refuse a nomination if he has reasonable grounds for so doing. What is 'reasonable' must take account of the importance of the timing of the nomination, and the preparedness to commit to completion of its works on a date that coincides with the program.

If the main Contractor declines to enter into a subcontract with nominated sub Contractor, the Engineer will have several actions open to him. The Engineer can nominate an alternative sub Contractor to whom main Contractor would not object, or omit the work in the subject of nomination from the main contract and have it carried out by an independent Contractor as long as the contract allows.

The British case of *St Modwen*[14] is an example of deciding the basis of sub contract. Here the contract between the parties stipulated that the main Contractor could choose whichever sub Contractor it wished; or a list of potential sub Contractors may be inserted into the Bills of Quantities by the Employer. The main Contractor may at its sole discretion choose a sub Contractor from that list. This guideline was not followed. The general practice was for the architect or Engineer on behalf of St Modwen Developments to obtain quotations from specialist sub Contractors for supply and installation of the specialist work. When the appropriate sub Contractor was identified by the design team and an instruction was given by Bowmer & Kirkland (B&K) to expend the relevant provisional sum by placing an order with the specialist sub Contractor chosen exclusively by the design team.

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[14] St Modwen Developments Limited vs Bowmer & Kirkland Limited (1996)

The issue is whether they were actually nominated sub Contractors. The procedure used meant that they were treated as though they were. Given this case and general legal principles, the label attached to a particular sub Contractor may not necessarily determine that sub Contractor's status. What may be of greater significance is the actual procedure used in the procurement process? The key question is the level of control the main Contractor was able to exercise in relation to the choice of sub Contractor. If the main Contractor is allowed to make an unfettered decision, then any sub Contractor engaged will properly be a domestic (or selected) sub Contractor. However, a list is provided consisting of a small number of potential sub Contractors, the Employer interferes with the procurement process, and/or the Employer ignores objections from the main Contractor as to the engagement of a particular sub Contractor.

In the above scenarios, the main Contractor's control over the selection and subsequent performance of particular sub Contractors is lessened and it becomes more difficult to justify placing responsibility on the main Contractor for the performance of the sub Contractor. Given the decision in Bowmer & Kirkland, what was highlighted is the circumstances leading to the appointment of any sub Contractor are more important than the actual label attached to the sub Contractor.

However, the Employer may when the identity of the sub Contractor is known at the time of tender, designate a sub Contractor in the contract document itself. This is a 'designated sub-contract' (DSC) that differs from nominated (NSC) with regard to payment provisions and objection. There are more limited rights of objection by main Contractor with regard to a DSC than with regard to an NSC, on the grounds of insolvency, technical incompetence, etc.

2.28 Assignment

An assignment is not a subletting, and vice versa. The underlying considerations are not the same. By assignment, the new occupant - the assignee - becomes the tenant itself. Hence, assignment is making over or transference to another the whole or part of the contract, any obligation, benefit or interest that may be derived under the contract. The 'assignment' clause restricts the Contractor to make such assignment in full or partial without prior written consent of the Employer, except the routing of the monies due under the contract to the Contractor's bankers. Any attempted assignment without consent is therefore amounts to claims by the Employer. A Contractor who decides to assign without approval therefore takes the risk of his employment being terminated. However, the Employer's consent shall not be unreasonably withheld or delayed and it is also necessary for the Employer to remain in a strong position contractually in order to withhold his consent from an assignment.

Assignment differs from novation (discussed later) in so much that the parties to the contract do not change where privity of contract still exists between the parties. The consent of the third contracting party is not necessary. So, a party to a contract (the assignor) is able to transfer the benefit of a performance he is to receive under that contract to another person (the assignee) who is able to enforce performance in his own right, without the consent of the other party (the debtor). Accordingly, a burden of a contract simply cannot be assigned without the consent of all parties.

There is always an express prohibition against an assignment. The making of an assignment is not a breach of contract because it is an act without legal effect. The assignment is ineffective unless a later consent is given. It is common in leases for a prohibition against assignment save with consent, not to be unreasonably refused. If consent is not sought, it can not be said to have been unreasonably refused. It is no answer that no reasonable objection could have been made had consent being sought.

Probably the most common use of assignment is in relation to collateral warranties. The collateral warranties given by consultants, Contractors and sub-Contractors are often assigned to subsequent Employers or leases. Assignment can do no more than transfer rights available to the assignor; it is not capable of creating new rights in favour of an assignee. Thus while the Employer can in theory assign the right to have a building adequately designed for instance; it is unclear what right would be transferred to sue for damages in the event of breach.

The obligations of the Contractor are vicariously performed by sub Contractors. However the Contractor could unless there is a prohibition, assign to another the benefit of the contract. If a Contractor has so assigned his rights, there are obvious dangers of insolvency and inability to actually complete the works, which is why such assignment is often discouraged. When there is such a restriction on assignment, and a Contractor has nevertheless assigned the benefits of the contract, the assignee can not enforce its rights to receive payments with a third party to account to him for the benefits he receives from the other contracting party.

Under an assignment, the parties to a contract will not change. The transfer will only involve the benefit, not the burden, of a contract. It is an exception to the usual legal rule in that a person who is not a party to the contract is permitted to obtain benefit from that contract. Therefore a Contractor can not assign to another Contractor the obligation to build and the Employer can not assign another party the obligations under its contract this is not surprising otherwise any party to a contract could get out of his or her obligations by the simple expedient of an assignment.

2.29 Novation

Employers often engage consultants to prepare designs or detailed project requirements prior to the engagement of a Contractor to carry out the works. Employers may also engage preferred suppliers or sub Contractors prior to get the 'main actor' on board. Such early planning or design may be required to obtain planning permission or financing for the project. One way of passing the responsibility for ensuring that certain work is carried out by these consultants or sub Contractors is by novating them to the main Contractor. If a party to a contract wants to assign its burden, it will have to enter into a fresh contract whereby its obligations will be discharged as against the other contracting party.

The concept of novation is usually only attributed to negotiated contracts as opposed to those for an open tender. The Contractor's problem with consultants' inflexibility in receiving instructions is sometimes amplified when there is a requirement for a novation of the design team from the Employer to the Contractor. The designers who originally prepared the Employer's requirements in schematic form now have to prepare the Contractor's detailed design, for instance in a traditional form.

The Employer could also lose the benefit of the Contractor's independent design and expertise as the Contractor would eventually be constructing a project based on the same source as the Employer's original design team that prepared the Employers requirements. Accordingly, a novation agreement is one by which the parties to a contract agree that one of them should be replaced by another party who will in every respect assume the rights and obligations of the outgoing party as though he had always been a party to the contract. The outgoing party is released from liabilities under the contract. Novation makes for a much cleaner break than a simple assignment, especially for the assignor, since once the contract has been novated; he has no further liability under the contract. The new party, on the other hand, could be held liable for some breach of contract which occurred before he became a party to the contract but which is only discovered later. Hence, the body of this agreement usually has three elements. In the first, the new Contractor (the assignee) agrees to become a party to the contract and to be bound by all its terms. In the second clause, the Employer releases the outgoing Contractor (assignor) and accepts the new Contractor. The third clause is really there for record purposes, to show payments made to the outgoing Contractor at the date of the agreement. It may also be useful to specify any amount which is owing to the Employer by the Contractor at the novation date and specify if the outgoing or incoming Contractor will be responsible for paying it. However this situation can not be confused with the provision where the FIDIC recommends parties to find where they stand financially in a unilateral valuation at the time of contractual forfeiture. What is important is to see whether the 'clean break' principle has been secured when contracts are novated and in the mean time, without saying that a novation agreement is not a stand-alone document.

There are a number of issues that an Employer should consider when novating consultants or sub Contractors to their Contractors. Some of they key issues would include how to deal with intellectual property, outstanding payments and insurance policies. Intellectual property -who owns what- is a question when novating any consultant or sub Contractor, especially with regard to any required moral rights waivers. Outstanding fees may also be an area of contention that requires payment of all money 'owing under the prior contract'. The amount owing may be subject to disputed variations or other amounts to offset under the contract. The Employer should be aware that the point of novation may be used by consultants and sub Contractors as the point of maximum leverage to extract money. The issue of warranties and indemnities can cause significant issues for all parties. The key is to ensure that the warranties required under the consultancy agreement or subcontract agreement match up to those required under the deed of novation and the construction contract in order to ensure a smooth transition.

2.30 Procurement choice

In a recently completed road project, the Employer needed to give 'green light' for the commencement of shotcreting works. Shotcrete is to stabilize the soils in cut surfaces in cliffs to avoid falling boulders on the road. This was a subject of provisional sum under the main contract where a significant profit would have been allowed in the contract sum. The main Contractor was arguing for an Engineer's instruction to work on domestic sub contract basis. The criteria established in selecting the sub Contractor are the technical capacity, the price and the legal compliance. Amongst the Contractor's request, there were five options; nominate a specialist Contractor, employ an independent Contractor, the Employer himself carries out the work or just omit the subject work from the scope and leave it for the next phase. It was the Employer's discretion to expend either wholly or party the monies reserved as provisional.

The Employer had no objection to delete the scope of shotcreting as a valid omission to the contract under variation clause. However, the final option was not advisable since no time can be allowed for falling rock. Neither the Employer had resources to self execute so that the option of getting the work in house was also skipped. Even though the variation clause in this particular contract does restrict the appointment of another Contractor to carry out works, it was suggested that it is possible if the Contractor were proved to be technically incapable to carry out the subject works. Finally the first option, that is domestic sub contract basis, was selected on the principle that just because a provisional sum is provided, it does not necessarily mean to go by nominated basis. The argument was that provisional sums can also be allowed in the bill of quantities for carrying out certain works even on domestic sub contract basis the details of which are scanty, vague, and immeasurable at the time of tender. More precisely, the surface area to be stabilized can not be determined till the surfaces are fully exposed only when the mountain cut is completed. In addition to the time taken for floating a new tender for nominated basis, just a site instruction is formal enough for the Contractor to start work. It also avoids a situation where the main Contractor may make an objection under the contract for any nominated sub Contractor who may be unwilling to have a back to back contract. Such a conflict may affect the completion of the project in turn.

However, the Employer decided to nominate a sub Contractor based on the quotations competitively obtained and furnished by the Contractor. The procurement was such that the Contractor initiates the calling of quotations at his choice. Quotations were evaluated and the second lowest was selected on technical preference. The Contractor objected the Employer's nomination based on his previous experience. However, on the request of the Employer in the second instance, the Contractor entered into an agreement with the sub Contractor on the terms dictated by the Employer. The works commenced at site and the Contractor submitted his monthly statement with a 10% mark-up over and above the sub Contractor's valuation. It was rejected, and only 5% were allowed since it has been expressly provided in the contract between the Contractor and the Employer. This 5% provision is the Contractor's attendance fee for facilitating the sub contract operations such as supply and relocating scaffolding and general supervision.

The provisional sum was however, exceeded to a greater extent, almost in double the amount, mainly due to high rates negotiated between the Contractor and the sub Contractor, in addition to substantial increase in quantities compared to what was thought at the time the provisional sum was established in the tender.

The reflection is that the Employer would have within its rights domestically sub let the scope of shotcreting to one of the specialized sub Contractors put forward by the Contractor allowing the Contractor to entertain the benefit of pre agreed rates with the sub Contractor. This would have made things logical in many respects. Alternatively, the Employer would have invited direct tenders and negotiate directly with tenderers well in advance having understood that the market of shotcreting is an oligopoly.

The lessons to learn were both direct and indirect in nature; directly, the significance of timely decision on procurement, the right choice and its relevance with the type and stage of the project. Indirectly, the significance of flexibility, disclosure and fair dealing in all matters and the presence of a representative to convince the Employer on behalf of the interest of the Employer rather than of the Employer alone.

2.31 Summary

A number of pricing and payment models have been evolved since a long time. They have been interchangeably used with the term procurement strategy since there seems a connection between the method of procurement and the method of pricing and payment. There are a number of standard routes that need early consideration. Each route places different demands, risk allocation and responsibilities and also results in different cash flow profiles on the Employer. The chosen route is then supported by a dedicated standard form of contract.

CHAPTER 3
CONTRACT INTERPRETATION

3.1 Introduction

Contract is the law between the parties, which can acquire force only by consent. It is the consent that makes the law as between the parties, conveyed in a legal instrument called contract agreement. Agreement takes the place of the law because it is the express understanding of the parties as the law would imply. Contract documents are complementary and mutually explanatory; what is called for by one is as binding as if called for by all. They are to be read in conjunction with other parts of the document.

Most construction contracts use standard terms and other special or bespoken terms supplementing with bill of quantities, specifications, and drawings. In these circumstances, the bespoken terms will prevail over the standard terms, unless the printed terms clearly stated otherwise. The reason is fairly prosaic, where the Courts will give effect to their words which the parties have chosen for their contract, in relation to surrounding circumstances or what is aptly called factual background.

As such, there are rules of interpretation that have been based on common sense connected with the ordinary life. It is the philosophy of language that provides material for interpretation. Courts prefer to place itself in thought in the same position as the parties to the contract were placed, in fact, when they made it. Basically, those involved in contract interpretation should not try to make a bargain for the parties, but instead seek to understand what the parties meant by reference to the words which they chose. The whole idea is to explore the intent of the parties had in their minds at the time they entered into the contract.

3.2 Doctrine of repugnancy

When there is an inconsistency which can not be reconciled, then the earlier clause will prevail over the later one. The purpose of this ruling is to avoid disturbing their obligations through the addition of later wording. This is in accordance with the doctrine of repugnancy where the Courts will not give effect to a term of the contract if it is repugnant to the primary obligation originally set out in the contract documents. However a sensible view is that the parties should construe the contract as a whole and deal with any inconsistencies on their individual merits.

A classic example is that a Contractor has been arguing on a site instruction given to him by the Engineer that the subject works shall be paid on the basis of a quotation. The Employer's in-house staff rejecting the rates on contractual grounds seeks clarification from the Engineer as to why he established a wrong basis of valuation while issuing site instruction. The Contractor contends that the Employer's staff has acted in contrary to the promise made by the Engineer that the works shall be paid on a quotation. It was found that the Engineer has no authority to enter into an agreement with the Contractor since the Engineer is not a party to the contract. More over, the Engineer's proposed method of valuation is not acceptable neither required since there are suitable bill rates in the existing contract to value the new work. The contract allows using fair rates whenever the circumstances render the existing rates inappropriate. Parties may mutually agree to new rates based on a minimum of three competitive quotations whenever the existing rates or rates on pro rata basis are no longer suitable. Accordingly, the Engineer's approach is repugnant to the primary obligation originally set out in the contract documents.

3.3 Entirety in agreement

Some contracts contain 'an entire agreement clause' which states the parties' intention that the written documents comprising the contract record the whole agreement between the parties. These clauses are generally taken as conclusive evidence that the written document represents the entire agreement between the parties. A provision of a geotechnical report at tender stage by one party and reliance on it by the other is an example. If a geotechnical report provided by the Engineer is included in the contract documents; the Contractor has relied on the report; and the report is incorrect in its description of site conditions, then the Contractor will likely be able to rely on the latent condition provisions in the contract where conditions differed from those stated in the report. If the report did not form part of the contract documents, the Contractor's claim may be less strong.

Another example is where a document has been provided to define the scope of works and the Contractor has priced and tendered for accordingly. Problems often arise when a number of documents, including drawings, are provided but few are specifically incorporated into the contract as contract documents. If the Contractor has priced the project scope based on non-contract documents and those documents are inaccurate or inconsistent with the contract documents, then the Contractor might be left without any recourse.

3.4 Literal rule

Linguistic mistakes are hardly made by people but if one would conclude from the background that something has gone wrong, the law will not attribute an intention which they plainly could not have had. To give effect to the whole document and meaning to every word is naturally the scope for interpretation, but it is not generally permitted, under English canons of interpretation to find meaning when none exists. The basic approach is literal, not purposive.

In other words, the law is to read, word for word and should not divert from its true meaning. This is why a 'definitions' section is given in a contract, to explicitly define the most important terms. But some contracts may fail to define a particular term. The plain meaning rule attempts to guide that turns on the meaning of a term not defined by the contract. According to the plain meaning rule, absent a contrary definition within the contract, words are given their plain, ordinary, natural and literal meaning. If the words are clear, they must be applied, even though the intention of the parties may have been different or the result is harsh or undesirable. The literal rule is what the law says instead of what the law means.

3.5 Golden rule

In law, the golden rule allows the interpreter to depart from a word's normal meaning in order to avoid an absurd result. It is a compromise between the literal rule and the mischief rule explained below. Like the literal rule, it gives the words of a contract their plain, ordinary meaning. However, when this may lead to an irrational result that is unlikely to be the initial intention, the judge may depart from this meaning. If the word only has one meaning, but applying it would lead to a bad result, the judge can apply a completely different meaning. The grammatical and ordinary sense of the words is to be adhered to, unless that would lead to some absurdity or inconsistency with the rest of the instrument, in which case the grammatical and ordinary sense of the words may be modified, so as to avoid any absurdity or inconsistency, but not farther. The second use of the golden rule is in a wider sense, to avoid a result that is repugnant to accepted public norms, even where words have only one meaning, for instance no one should profit from a crime, and so is the golden rule to prevent an undesirable result.

3.6 Mischief rule

This is an attempt to determine the mischief that the contract in question has set out to remedy, and the ruling that would effectively implement this remedy. The application of mischief rule gives the judge more discretion than the literal and golden rules as it allows him to effectively decide on the intent. Repugnancy in a contract must be reconciled, if possible, by such an interpretation as will give some effect to the repugnant clauses, subordinate to the general intent and purpose of the whole contract. In essence, where two clauses of a contract appear to be contradictory, the Court may attempt to reconcile conflicting clauses so as to give effect to the whole of instrument (assuming that is possible within the framework of general intent of the contract).

3.7 The blue pencil rule

As per the blue pencil doctrine, Courts exercise an authority to either strike unreasonable clauses from a non complete agreement, leaving the rest to be enforced, or actually modify the agreement to reflect the terms that the parties could have - and probably should have - agreed to. Courts generally put the blue pencil down and refuse to enforce agreements imposing unreasonable restraints. Moreover, Courts have indicated a greater willingness to refuse to reform agreements that are not reasonable on their face. A classic example is where some contracts have been drafted in one-sided language biased towards the Employer. There are contracts with full of eventualities subject to penalty imposition, restricting the freedom of construction. However, Courts are reluctant to use the blue pencil and strike off such clauses provided the intention is exactly the same the parties had in their minds and what they freely desired that genuinely made them entered into a contract without coercion.

3.8 Contra preferentum

In case of a doubt, a contract is construed against the interests of the author of the contract, according to contra preferentum rule. This rule provides that an ambiguous term will be construed against the party that imposed its inclusion in the contract– or, more accurately, against the interests of the party who imposed it. Therefore, the interpretation will favour the party that did not insist on its inclusion. The rule only applies if, and to the extent that, the clause was included at the unilateral insistence of one party without having been subject to negotiation by the counter-party, which is often the case in construction where the parties agree on standard forms of contract. Additionally, the rule only applies if the Court determines the term to be ambiguous, which often forms the substance of a dispute.

The reasoning behind this rule is to encourage the drafter of a contract to be as clear and explicit as possible and to take into account as many foreseeable situations as it can. Additionally, the rule reflects the Court's inherent dislike of standard-form take-it-or-leave-it contracts, also known as contracts of adhesion. The Court perceives such contracts to be the product of bargaining between parties in unfair or uneven positions. To mitigate this perceived unfairness, legal systems apply the doctrine of contra preferentum; giving the benefit of doubt in favour of the party upon whom the contract was foisted. Contra preferentum also places the loss on the party who was in the best position to avoid the harm. This is generally the person who drafted the contract. An example of this is the insurance contract where the insurance company is the party that is completely in control of the terms of the contract and is generally in a better position to, for example, avoid contractual forfeiture.

The doctrine of contra preferentum is therefore a sensible tie-breaker, on the ground that the party who drafted the contract was probably in the position better than the others to avoid ambiguities, though this is not necessarily the case, since the other party in some instances might have more information concerning a particular contingency.

3.9 Parole evidence

This is a rule of evidence that prevents a party to a written contract from contradicting (or sometimes adding to) the terms of the contract by seeking the admission of evidence outside to the contract. This means that oral terms and conditions made before execution of the written contract that contradict its express terms are inadmissible. In order for this rule to be effective, the contract in question must be fully integrated in writing; it must, in the judgment of the Court, be the final agreement between the parties (as opposed to a mere draft, for example). One way to ensure that the contract will be found fully integrated is through the inclusion of a merger clause, which recites that the contract is, in fact, the whole agreement between the parties.

3.10 Terms of a contract

A term may either be expressed or implied. An express term is stated by the parties during negotiation or written in a contract document. Implied terms are not stated but nevertheless form a provision of the contract. There are many ways a term can be implied. Terms can be implied in fact. An implied term must be reasonable, equitable and necessary for the business efficacy of the contract. For instance, if a term simply causes the contract to operate better, that does not fit this criterion. A term must be so obvious that it goes without saying.

Furthermore, a term must be capable of clear expression. No specific technical knowledge should be required. An implied term must not contradict an express term. A term must be necessary to ensure reasonable or effective operation of a contract. Terms can also be implied in law. These are terms that have been implied into standardized relationships. Terms can also be implied by custom or trade. To imply a term due to custom or trade, one must prove the existence of the custom, which must be certain, legal and reasonable. A custom can be incorporated into contract only if there is nothing expressly or impliedly in the terms of the contract that prevent its inclusion. Customs can often be a part of a particular trade or business sector, but to have effect they must reinforce and assist the agreed contractual terms.

Where a term is implied to fill a gap in the contract so as to give effect to the presumed intention of the parties, the term is implied in fact and depends on consideration of the language of the contract as well as the surrounding circumstances. A term will be implied only if it is so necessary that both parties must have intended its inclusion in the contract. The fact that it would be reasonable to include the term is not sufficient for the implication, as the Courts will not re-write the contract for the parties. Terms may also be implied statutorily or on public policy.

As mentioned, where the parties usually state the terms which they consider materially given in the contract, such terms are express terms. Express terms may set out the extent of a party's obligations under a contract or seek to limit a party's liability in the event of a breach of contract by him. Sometimes, however they consider a term as so obvious that they fail to express it in their contract. Such terms are called implied terms. Courts are usually reluctant to imply terms into a contract and will do so only when strictly necessary. Implied terms may be divided into three groups. The first consists of terms implied in fact, that is, terms which were not expressly set out in the contract, but which the parties must have intended to include. The second consists of terms implied in law that is, terms imported by operation of law, although the parties may not have intended to include them. The third consists of terms implied by custom.

The Court of Appeal implied a term in *Hancock vs. Brazier*[15]. In this case the contract stated that the Contractor would in a proper and workmanlike manner erect the house in accordance with the plans and specifications. There was also a provision in the contract that any structural defect in the house if discovered within six months of completion would be made good by the Contractor. The ground floor of the house was above a hard core base. Unknown to the Contractors the hard core had sodium sulphate presence which within a period of two years absorbed moisture and swelled so that it caused the floor to crack with substantial damage being caused. The Court of Appeal held that there was an implied term that the house would be fit for human habitation and that the express term as to proper workmanship did not deal with the fitness of materials and so did not exclude any implied term as to fitness of materials.

In nutshell, Courts will not imply terms merely to make a contract more reasonable in its consequences. They will only imply a term if, without it, the contract would be commercially unworkable[16]. It may also be equally important when a contract would be technically un-implementable. However a limitation applies. No term will be implied that is inconsistent with, or contrary to, the express terms of the contract. All the circumstances must therefore be taken care of before a term can be implied and that the decided cases can only be a guide and not the final arbiter.

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[15] Hancock v BW Brazier Ltd [1966] 2 All ER 901

[16] Duncan Wallace, Hudson's Building and Engineering Contracts, 10th edition (1978)

3.11 Reasonably inferred

A contract comprises the construction, completion and maintenance of the works and 'everything' needed to fulfil the same including labour, materials, plant etc irrespective of whether they are temporary or permanent in nature and whether specified or reasonably inferred from the contract. The word 'everything' is sufficient to dispel the limitations to fulfil any contract requirement. The phrase 'reasonably inferred' covers every minor detail necessary for the satisfactory execution of the contract beyond what is expressly stated in various parts of the contract document. Any work, materials or equipment that may be incidental or anecdotal from the contract as being required to produce the intended result will be supplied whether or not specifically called for.

A clause occasionally found in construction contracts is that "sub Contractor shall perform the work as shown in the attached plans and specifications and as may be reasonably inferred from those plans and specifications". It is certainly understandable that an Employer or the main Contractor wants a complete project and that there are likely to be lots of very small and miscellaneous scope of work items that are done just in due course of finishing a project. This is simply because every single nut and bolt can not be described in a project's scope. Another clause is that restricts the Contractor to seek for adjustment in the preliminaries till the contract price has been exceeded by a certain cut off limit, say 20% due to varied work. This clause in turn would infer that the Contractor may well be having a right to claim for adjustment in preliminaries due to varied work the net resultant effect of which exceeds 20% of the contract sum, unless mentioned otherwise in the contract.

3.12 Fitness for purpose

Many standard forms impose a fitness for purpose obligation upon the Contractor as well as the designer, in varying magnitudes. This is one of the most obvious ways of transferring risk from one party to the other and thus avoiding state of the art defences raised by them when the subject matter; be it a design or a product; fails to achieve its purpose. Contractors often argue that it is unreasonable for them to assume a higher degree of responsibility for design than an Engineer would have carried had it been appointed directly by the Employer to carry out the design.

The fitness for purpose obligation must also be read in conjunction with the relevant contractual provisions. It varies with the context in which it is used. In a design and build context, the Contractor is held responsible for the design of the work and its accuracy including design criteria and any calculations. The Employer is not responsible for any error, inaccuracy or omission in the design except in relation to the definitions of intended purpose of the work. However, making the Contractor liable for the Employer's own errors as in certain instances make the fitness for purpose obligation even more onerous, since it depends on technical interface. Fitness for purpose simply means the robustness, compatibility and appropriateness for the intended purpose.

3.13 Exemption clauses

Exemption clauses exclude or limit a contracting party's liability. The English Unfair Contract Terms Act 1977 either invalidates exception clauses or limits the efficacy of such terms by imposing a requirement of reasonableness. Whether an exemption clause will have its intended effect depends on a number of factors. The threshold requirement is that the clause must have been incorporated into the contract. Where a party has signed a contract which contains an exemption clause, the signatory is bound by the clause, even if he or she had not read or was unaware of the clause. An exemption clause may also be incorporated, in the absence of a signed contract, if the party seeking to rely on the clause took reasonably sufficient steps to draw the other party's attention to the existence of the clause. The determination of this issue is heavily dependent on the facts of the particular case. Finally, exemption clauses may be incorporated because there has been a consistent and regular course of dealing between the parties on terms that incorporate the exception clause. Even if no steps were taken to incorporate the clause in a particular contract, it may have been validly incorporated by the parties' prior course of dealing.

As mentioned, sometimes, the conditions of contract exclude or limit the liability of one party far beyond the limits to which the other party freely consenting would ever agree. Courts sometimes favour exemption clauses in contracts, if they are expressed clearly and without ambiguity. They must also clearly cover the exact contingency or loss which has occurred if it is to protect the party relying on it. For example the exclusion of warranties will not exclude conditions and the exclusion of implied terms will not exclude those which are actually expressed. According to the contra preferentum rule the words of a written instrument are to be construed more strongly against the grantor or maker of such instrument. Therefore, the party trying to deny the applicability of an exemption clause will often be benefited by this rule. Also, Courts have formulated a rule that persons who are not parties to a contract cannot claim the benefit of an exemption clause in contract.

3.14 Privity of contract

Only persons who are party to a contract may enforce rights and obligations arising from that contract. This is sometimes referred to as the 'privity rule.' A third party who is not privy to a contract is generally not allowed to bring any legal action for breach of contract against a contracting party who fails to perform contractual obligations, even if such failure of performance has caused the third party a loss. However, there is no clear definition as to when a person is or is not privy to a contract. Generally, a party who is an offeror or offeree will be privy to the contract.

It is, nevertheless, possible to have a multilateral contract where there are multiple offerees (one or more of whom accept the offer on behalf of the others) or where there are multiple offerors (one or more of whom make the offer on behalf of the others). In either case, each offeree or offeror is a joint party to the contract and the privity rule will not apply to them. In construction contracts this rule is more likely to apply to one party's unilateral terms i.e. bespoken construction contracts. These often seek to give a distinct advantage to the proffered over the other party.

Some arbitral tribunals and Courts have decided that an arbitration clause in one contract between the parties would also apply to other agreements between the same parties if the agreements relate to the same project. Some arbitrators refer to this as "a unified contractual scheme" and it does not affect the privity of contract.

3.15 Freedom of contract

Nevertheless, the implied duty of good faith and fair dealing apparently influences the Courts when they construe express duties. Indeed, although Courts frequently hold that implied duties can be waived or excluded by the express language of the contract, a number of cases have limited this principle and have enforced an implied obligation to provide accurate and complete information, or to not intentionally interfere with the other party, despite express contract language intended to avoid such responsibilities.

Courts generally admire the freedom of contract, meaning that the parties are free to contract on their own terms as far as possible and these agreements should be upheld and enforced by Courts. The parties are the masters of their own fate. However, when Courts find unfair deals, Courts may recommend incremental solutions rather than adopting a broad overarching good faith principle. For example, in relation to construction contracts, Courts will commonly imply terms into a contract to remedy an unfair situation on the basis of the parties' presumed intention. One example is that the Contractor must do all work under the contract with proper skill and care which can not be contested in lawsuits.

A contractual term which has not been individually negotiated shall be regarded as unfair if, contrary to the requirements of good faith and it causes a significant imbalance of the party's rights and obligations. Accordingly, parties are not permitted to take undue advantage of the other party's necessity, indigence, lack of experience, unfamiliarly of the subject matter of the contract, or weak bargaining position. The terms must be expressed clearly and legibly containing no concealed pitfalls or traps. A classic example is when penalty imposition, though it is labelled as liquidated damages sometimes, befalls unfair by the

Contractor. Levying penalty according to a schedule of eventualities qualified already in the contract is not a fair dealing at all. In fact, the Engineer's authority to consider further penalty if he deems required is indeed a misuse of discretion beyond legitimate limits. However this discretion has no legal effect, so is a 'dummy' clause that is non-enforceable when the other eventualities meet the ceiling limit of penalty, all of sudden. Courts may find this clause not enforceable as it openly kills the concept of pre agreed genuine estimate of likely loss. More over, the contracts with full of penalty events that keep the Contractor in a very inflexible setting that restricts him in managing the project is against the doctrine of fair dealing.

It is fundamental that the parties are only bound to perform what is stipulated in the contract document they sign. Variation clauses for instance introduce much needed flexibility into somewhat rigid rules that otherwise govern the parties' obligations arising under building contracts. Typically, the intent of the variation clause is to enable the Engineer to vary the works 'under' the contract and not 'in' the contract. A clause vesting some powers on the Engineer is to form an opinion as to suitability and applicability of a new rate and the limit of enhancement of an existing bill rate. It will be an unfair deal when the Engineer unilaterally fixes a rate for new work without giving the Contractor an opportunity to negotiate. But the Courts will interfere in agreements procured by the exertion of economic duress by one party on the other, if there is compulsion on, or a lack of practical choice to agree into a fair rate. If the nature and scope of omission renders the existing rates no longer appropriate, the Engineer should use his authority in good faith in order to adjust it to an appropriate extent in such a way that the Contractor obtains a reasonable profit. Another example would be a threat by a sub-Contractor to withhold the delivery of a crucial piece of equipment until an extension of time is granted or the sub-contract price is increased. Conversely, it might include a threat by the main Contractor to refuse to grant the sub-Contractor an extension of time, and to apply LDs for delay, unless the sub-Contractor agrees to carry out a substantial variation at minimal cost.

3.16 Subject to contract

Subject to contract is wholly a question of construction whether the execution of a further contract is a condition precedent. It may also be a mere expression of the desire of the parties as to the manner in which the transaction already agreed to will in fact go through. An incomplete agreement however cannot afford to an enforceable contract. Agreements made 'subject to contract' may be considered incomplete if the intention of the parties, as determined from the facts, was not to be legally bound until the execution of a formal document or until further agreement is reached. If a contract specifies 'subject to contract', it may fall into one of three categories; the parties are immediately bound to bargain, but they intend to restate the deal that will not have a different effect; or the parties have completely agreed to the terms, but have made the execution of some terms in the contract conditional on the creation of a formal contract; or it is merely an agreement to agree, and the deal will not be concluded until the formal contract has been drawn up.

3.17 Condition precedence

There are contingent conditions in two categories: condition precedent and condition subsequent. A condition is an event, not certain to occur, which must occur, unless its non-occurrence is excused, before performance under a contract becomes due. Conditions precedents are conditions that have to be complied with before performance of a contract. With conditions subsequent, parties have to perform until the condition is not met. The term 'subject to contract' ought not to be confused with agreements which contemplate that a later agreement will be made of a more formal variety but where nonetheless the parties wish to bind themselves in the meantime.

A condition precedent need not be explicitly described in a contract. But the existence of one term as an explicit condition precedent may by negative implication make other terms promises and not conditions. However, a party may waive a condition precedent to its own performance; it may also withdraw that waiver before the other party has acted in reliance on that waiver. A time bar clause is in essence a condition precedent clause, which requires the giving of a notice by the Contractor, usually within a specified period of time, for any matter that may give rise to a claim for additional time or money. The intention of such clauses is that a failure to issue the required notice will have the effect that the Contractor's rights in respect of that matter will be lost.

3.18 *Chavasse* park

In a recent case of *Liverpool City Council*[17], the Court considered the extent to which a general obligation for a party to act reasonably can be extended. Parties entered into a re-development contract in 1996 related to an area called Chavasse Park. It had a number of conditions precedent. In 1998, the council changed its planning policy in favour of a rival development and stated that it would resist any significant retail development other than the rival development.

In 1999, the agreement became operative and the council called upon Walton to satisfy the first phase of the conditions precedent. These included a requirement that Walton commissions an independent consultative study, based on a planning brief to be agreed between the parties. The study was to be 'subject to the approval of the council' whose decision shall be final and binding. If the council rejected the study, it would be entitled to terminate the agreement.

The council sought a ruling from the Court that it could make a decision in relation to the study in accordance with its own views, considering its current planning policy, and that there should not be implied into the agreement any term to the effect that its approval of the study would not be unreasonably withheld. Walton counterclaimed, and sought declarations that there was an implied obligation on the council to co-operate with Walton in implementing the agreement.

The Court found that it was not possible to say that there was a general duty on the council to cooperate with Walton in executing the agreement. It thought that to impose such a general duty would result in a duty which was very broad and vague and therefore potentially onerous. However, there were specific aspects of the agreement which carried an implied obligation on the part of the council to co-operate and not to unreasonably withhold its approval.

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[17] Liverpool City Council v Walton Group plc [2002] 1 EGLR 149

The Court considered that the council could potentially be in the position of being able to prevent the development by Walton, by the arbitrary withholding of approval of the study. The Court decided that this would not have been intended by the parties at the time the agreement was entered into, and noted the high level of costs Walton had already incurred. The fact that the council's decision was expressly said to be 'final and binding' did not preclude the Court from implying a term that approval of the study by the council would not be unreasonably withheld. The Court also decided that it was not open to the council to reject the study on the ground that it preferred the rival development. The agreement did not permit the council to consider the merits of Walton's proposed development by reference to the rival development.

It shows that while a Court will be prepared to imply a condition for a contracting party to act reasonably or to co-operate in relation to certain aspects of a contract, if it is proper to do so in the circumstances, it will not imply a general obligation into the contract as a whole.

3.19 Internal consistency

It is presumed that a contract will be interpreted so as to be internally consistent. A particular section of the contract document shall not be divorced from the rest of the contract document. The '*ejusdem generis*' rule applies to resolve the problem of giving meaning to groups of words where one of the words is inherently unclear. It must be given a meaning of the 'same kind' as the word of established meaning. This is particularly the case when two or more words are conjoined, i.e., linked by the word 'and' as opposed to placed in a disjunctive relationship, by the word 'or' where the interpretation of two or more words might be different depending on the circumstances. As such, various canons give common sense guidance to interpret the meaning of clauses. The same word used in one place in a contract should be given the same meaning throughout the document. The word 'may' is permissive and not obligatory. The word 'about', 'approximately' or 'almost' do not constitute any guarantee that the signatory will meet or exceed estimates worded in such a fashion unless performance falls significantly short of these estimates.

Handwritten or typewritten clauses take precedence over printed clauses for two reasons; written clauses are posterior to printed clauses, and, secondly, written words are the immediate language selected by the parties themselves to express their meaning, while the printed words are a general formula applicable to all parties. Where the rule applies, the special clause will override the printed clause to the extent of the inconsistency. The special clause however only takes precedence when it is in direct contradiction with the printed clause.

Recitals may be resorted in case of ambiguity. Usually the articles of agreements or recitals are no more than the standard printed forms. The recitals can not be resorted to if the express words of the contract are clear or there is no doubt about what they mean. However, in modern law the extrinsic evidence are sometimes looked into find the intension of the parties, so is the recitals having similar preference.

3.20 Best guess rule

If a contract is not clear on its face, but instead is vague or ambiguous, the judge will have to go outside the contract to decide what it means. But he can go outside it without getting entangled in the sort of factual disagreements that require a trial to untangle. He can, in other words, go outside it without taking evidence but using common sense.

At the outset, Courts determine whether contract formalities are satisfied. If so, the Courts then determine whether there was real consent free from vitiating factors such as fraud, duress, mistake and so forth. Thirdly, the Courts determine what the contract says in nutshell. If there is a gap (that is if the contract does not address the contingency that caused the dispute), Courts apply a default rule and if an explicit or implied term was violated, Courts award a remedy. This step by step process is the last resort a Court would adhere to.

Gap-filling can happen either by implications of terms by law (statutory default rules) or by constructive interpretation (using general clauses and other legal principles). This is where the parties have omitted to say something the judge must discover and take into account in the light of the whole purpose of the contract (that the parties would have said if they had regulated the point in question, acting pursuant to the requirements of good faith and sound business practice). Therefore, the gap has been filled by the common intent of the parties.

An example is in a particular contract, penalty was laid down in two places, namely the Amended Conditions of Contract Sec C, clause 47 and the Project Specification Sec D; Part 2, (subject to the limit of 10% of the contract price as stated in Form of Tender) applicable in four distinct failures as follows;

a. In submitting clause 14 program
b. In submitting revised program/s within 14 days of such instruction
c. In completing the whole of the works, and
d. In completing any part of pipeline and manhole construction

Although the penalty imposition in above (d) is absolutely insensible (unnecessarily restricts the site movements), the Engineer had no suggestion to alter the contract since it was what bargained for by the parties. In the meantime, the Contractor lodged an application to waive off penalty to ease out his cash flow constraints on the following grounds;

a. Areas that were not available for the Contractor because of the road closure
b. Additional involvement for other Contractors.
c. Delays in manholes construction due to lack of access to sewer lines
d. Shortage of material such as dune sand and pipes.
e. Delays in manhole construction where backfilling is outstanding
f. Delays in works related to open trenches in 'Wall' Street
g. Lack of logistics (traffic diversion approval, dewatering permit, screening permit)

h. Introduction of a new specification and the requirement of pressure testing
i. Newly constructed sewer lines as 'artificial obstruction'
j. Delay in delivery of pipes due to delay of suppliers
k. Subsequent improvement in the progress, despite of above reasons

There was a delay in pipeline and manhole construction so that the Engineer imposed penalty as per the schedule given in the project specification. Although the mechanism to calculate penalty for pipeline and manholes is not specified, it was obvious that it should based on physical progress on site where the maximum time period has been specified for completion of each 100 metre pipe length according to the average depth.

The Contractor argued that there is a multiplication of each part of pipeline 'consecutively and cumulatively', (these expressions were not clear) resulting in a duplication of penalty for the same pipe line, simply because of the words 'any part'.

However, it was found that if the clause (d) of Sec D part 2 General page D (2)1/10 (i.e., start to complete through road, lane and verge) is strictly followed upon a pre-determined layout, there won't be any duplication. 'Any part' for the purpose of penalty means any segment or section of individual pipe line that has a 'minimum' length of 100 metre and the words 'any part' does not therefore bring ambiguity.

Under circumstances, it was provided that any pipeline that does not exceed 100 metre can not be subject to penalty on pro-rata basis on the principle that this provision is not 'technically implementable' by any experienced Contractor. Accordingly, parties were advised to adjust their calculations instead of deferring the application of the penalty clauses.

Any subsequent improvement in the progress to catch up delays and providing access to other Contractors are not the matters to waive off penalty, and in fact they are a Contractor's obligation. Any fast track operations to catch up previous delays are the Contractor's acceleration by obligation. It was therefore decided that only a successful time extension claim can waive off penalty on the allegations against the Employer. The contract does not provide for subsequent reverse of penalty, similarly in the case of time extension once given.

3.21 Without prejudice rule

In a sale of shares in a company, the claimant needed to put forward tape recordings of discussions previously had with the defendant as evidence. The defendant contended that they were inadmissible.[18] It was held that 'immunity' has been attached along with the 'without prejudice' negotiations and there is no basis in principle for limiting the rule to negotiations aimed at resolving the legal issues between the parties. What is required is that negotiations must be genuinely aimed at a win-win settlement and as long as this criterion is met, the proposals, ideas or compromises exchanged each other are irrelevant. As such, the communications whatever took place will be protected if there is an intention to speak without prejudice followed by a genuine proposal or negotiations aimed at avoiding litigation.

The 'without prejudice' rule is therefore designed to encourage parties to express themselves freely and without inhibition, encouraging full and frank discussion, during which the parties may make concessions with the intention that they may not be disclosed at a later proceeding. Since communications may involve confidentiality and indicate some admission of weakness or liability, without prejudice rule helps parties to feel free in bringing down different ideas and options, without fear of being contested at Courts in case negotiations fail. Hence all correspondence that took place during negotiations may be packed together and named 'privileged' so that a party is not obliged to disclose during the disclosure and inspection process of an arbitration or litigation action. However, the documents under the label of without prejudice shall be invalid, unless they are intended to be part of a genuine settlement attempt so that they will not be protected from subsequent disclosure.

However, the tendency to use 'without prejudice' is seen in contractual correspondence. It should be noted that the bottom line is if a letter is written 'without prejudice', it is privileged and cannot be used in Court as evidence. This qualifies the signatory as exempt from the content to the extent since it may be interpreted as containing admissions or other interpretations which could later be used against him or her.

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[18] Forster v. Friedland, 1992,CA 1052

3.22 Good faith and fair dealings

The term good faith, bona fide in Latin, has been exploited in many areas of the law but has special significance in law related to construction. It is expected that the parties to a contract will act in good faith and fair dealing at all times. To meet this test, it is honesty that comes first in the conduct of transactions in achieving a reasonable commercial standard of fair dealing in the trade. These standards are usually set out in form of specifications taken for granted in the industry. Accordingly, good faith incorporates both subjective elements by requiring honesty and objective elements by requiring adherence to standards. Although good faith and fair dealing go together, it is bad faith, more easily recognizable so that a party may contest in a lawsuit when only a bad faith prevails. For example, negotiations taken place in parallel when the Contractor believes that it is the only party engaged in those negotiations, which is bid-shopping by definition is not a fair deal. According to Lord Justice Bingham, good faith is in essence a principle of fair and open dealing where the parties should not betray each other.

Some duties of good faith have found their way into construction contracts, for instance all tenderers are entitled to know all the grounds upon which their bids are assessed. The rationale for imposing a duty in such circumstances is that the tenderer is called upon to deserve often a significant expenditure. It is unfair to expect them to do so while material facts are withheld from them.

A Contractor is bound to give a notice at the earliest practicable opportunity whenever he came across something bad is likely, such as a physical obstruction that will hamper progress. Also, the Contractor is obliged to take steps to mitigate delays and apply his 'best effort' to minimize impact on time, albeit how much effort would amount to best effort is not known in exact terms. The Engineer on the other hand is under obligation to address any claim, either accept or deny, within a reasonable time, and the Engineer must inform the Contractor in writing precisely why and how it is denied with the provisions upon which it was relied.

It is hoped the certifier must act honestly in spite of the fact that the certifier is often the agent of the Employer. As such, there can not be technical excuses to refuse performance when the surrounding circumstances or apparent understanding of the parties were to the contrary. Further, the Engineer shall proceed to agree or determine any matter and shall consult each party in an endeavour to reach an agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the contract, taking due regard to all relevant circumstances. In nutshell, parties should not aim to interpret an issue in vacuum but 'play fair' with each other without breaking their word. Courts interpret this covenant to mean that neither party will commit any act that will have the effect of destroying the right of the other party to "receive the fruits of the contract." Courts, however, have refused to allow an independent cause of action for a breach of the covenant of good faith and fair dealings apart from a claim for a breach of the express contract.

3.23 Summary

A contact is the law of the contracting parties and neither party may separately rescind it or amend its provisions except to the extent of the limits allowed by the agreement, or mutual consent, or where the law provides otherwise. In the absence of an applicable provision in the contract, the Engineer, any tribunal or Court, shall decide according to customs (and traditions) in the building industry. In absence of a custom, an independent decision is sought by the parties who must be guided by the principles of local jurisprudence, which is most consistent with the facts and interests of the country or on the other hand, what is called natural justice, which is acceptable with the natural way of life.

Accordingly, the customs which are repugnant to the social, economic, political or moral basis on which a particular segment of the society is established can never rise to the rank of custom, although being in use for a considerable period of time. Custom must represent the touch stones (the accepted societal values) which legislation is unable to cover because of its varieties and inability to address them all in individual contracts. Meanwhile, a contract shall not be confined to the provisions contained therein or even to the legal provisions governing it. It is intended to be contained, and geared towards the requirements implied in accordance with customs, with the principles of equality, good faith and fair dealings.

A contract must be read as a whole. No one should construe words in a vacuum but consider all background knowledge which would reasonably have been available to the parties in the situation in which they were at the time of the contract. A contract must receive such an interpretation as will make it lawful, operative, definite, reasonable, and capable of being carried into effect, if it can be done without violating the intention of the parties.

CHAPTER 4
ATTRIBUTES OF CONTRACTUAL PROVISIONS

4.1 Introduction

Attributes are the features of a contractual provision. Attributes essentially describe the elements and their characteristics of a given clause. The importance of having known to these attributes support in sensible contract drafting. This chapter has been dedicated for the identification of those attributes attached to a couple of contractual provisions used in any standard form of contract, starting with the 'definitions' clause as usual.

4.2 Definitions

The characteristics of a definition are the specificity, distinctness and ability to identify the boundaries of the context in which it is used. For instance the term 'Cost' might invite contention as to whether profit excludes. Cost is to include basic cost (materials, labour and plant) plus site and head office overhead but exclude profit. Another classic example is to differentiate between the terms Contract *Sum* and Contract *Price*. Contract Sum is the sum named in the Letter of Acceptance whereas the Contract Price is the final approved sum after adjustments as may be made in accordance with the Contract. However, these terms have been interchangeably used in many contracts resulting in ambiguity. Another example is Letter of Award meaning a letter constituting the acceptance of the Tender issued to the Contractor by the Employer forming part of the Contract confirming that the Employer will enter into a contract with the Contractor subject to the terms contained in such letter. This is not the letter of intent in strict legal sense.

Definitions take the capital form all the way through the text so that for instance the meaning of works and Works are totally different in contractual jargon. Further, care must be taken not to effort defining subjects of large scope at varying degrees of application such as value engineering, risk management etc since definitions are not explanatory notes. It is also dangerous to repeat the definitions in the text for instance what a variation is since the clause 51 in traditional forms start explaining the scope of variation. Another example is what a dispute is since it is difficult to objectively demarcate the interface between a dispute and a difference of opinion.

However, the definition clause can be used to hedge against any interpretation in ones own favour on the variability of the term. Variability means the variety of circumstances in which a particular expression is used, for instance the term 'concurrent delay' has been contentious in what it really means. It can however be defined to cover up the exact scope with definite limitations if any. Concurrent delay can mean the time impacts due to two or more delay events, some of them accountable by the Contractor and others by the Employer, falling at the same period, each of which when taken independently critically affects the scheduled completion of works. Not only can this definition sort out the issues connected with the meaning of concurrent delays, but also help in detecting the element of concurrency in a time analysis.

4.3 Engineer's role

With a varying degree of authority, the Engineer's role has been taken up at a number of provisions. Basically, the Engineer is the Employer's agent to look after the interests of the Employer. The 'contractual' Engineer can be any one designated as the Engineer under the contract and is the sole source of instruction for the Contractor to adhere.

The level of authority of decision making is the next dimension of this clause. The Engineer shall take decisions, form opinion, value work done, and adjudicate disputes etc so that its function is basically manifold. While retaining some of the powers with the Employer, the Engineer has been obliged to take decisions on behalf of the Employer. Under what circumstances the Engineer has to refer to the Employer in taking decisions are sometimes specified in the contract. Such one instance is the instructions the outcome of which exceeds the contract sum by 20%. In the event the Engineer being required under the terms of its appointment by the Employer to obtain the prior approval of the Employer in relation to any matter governed by the contract, particulars of such requirements shall be set out in the Appendix to Tender. Although this mechanism works well in some contracts this indirectly gives some signal for the Contractor to be alert on the possible diminution of the authority of the Engineer. Also in some contracts, the provision related to Engineer's role specifies a delegation onto the Engineer's representative at least to some degree. Since the Contractor has been warned to take instructions only from the Engineer, the identity of the Engineer's instruction has been secured through another provision, which stipulates that the Contractor is to treat such instructions though had it been given by the Engineer.

Almost in all provisions, the element of consent is common, as far as the Contractor is concerned, in discharge of his duties along with the Engineer. Also, the Employer's intervention is an important characteristic in any contract in order to keep control over the Engineer's powers vested in him. This is usually through a clause on revocation of powers. Hence, the limit of scope in the decision making (on the part of the Engineer's representative) must be stipulated by contract. Although the Engineer's representative's role is to watch and supervise the physical progress, it may extend up to commercial or contract management tasks. Accordingly, some contracts mandate a notice of any such adjustments to be made in writing so that both parties as well as non parties to the contract know where they are 'standing'.

However, in some contracts, the role of the Engineer is not defined because the conditions of contract assume an absolute responsibility upon the Engineer while conferring a considerable degree of authority to act on behalf of the Employer. This in turn exposes the Employer to liabilities in case the Engineer acts in '*ultravirs*'. As such, the contract conditions must be articulated in such a way that the Engineers' authority and discretion has been level headed so that the Engineer is set in a flexible position to act impartially in discharge of his duties including various determinations under the contract.

4.4 Contractor's design responsibilities

The dichotomy between design and construction has several important legal implications. First, the Contractor is generally responsible for following the plans and specifications. The Contractor's liability includes correcting any 'non-conforming' work and for any harm caused to the Employer and others due to work that does not conform to the plans and specifications.

Conversely, the Contractor is generally not liable for problems caused by the design. Thus, if the Employer finds that the design does not serve the Employer's purposes, the Contractor will bear no liability for that. Similarly, if the design is found to be defective (e.g., because it cannot be built, or is contrary to building codes), the Contractor not only bears no responsibility, but will also be entitled to extra compensation for any losses it incurs because of the design defects.

Some contracts shift allocation of partial responsibility back to the Contractor by imposing a duty on the Contractor to review the design and discover any design errors before starting work. However, in design and build modalities, the Contractor takes full liability for design, unless otherwise specifically stated in the contract. The extent of design liability is an iterative dimension in any contract where a design component is involved. In part to deal with the tension between the two processes, various design approaches have been evolved. Construction management is one such approach by which Employers retain their Contractor in a managerial capacity to review the plans and specifications as the design process is underway, thus keeping the construction manager liable to review the design, while providing input at an earlier stage when changes can be made more easily. However, shop drawing is not a source of design; instead they show how they plan to supply the details of the design that are not specified in the contract drawings. These details are shown on 'shop drawings' prepared by each sub Contractor, showing how that sub Contractor will handle its part of the work.

4.5 Insurance

Insurance itself is a separate contract with sureties jointly and severally bound to undertake indemnity against losses on the part of both Contractor and the Employer since they are not in a position to look after each other. Insurance is a risk sharing mechanism where a huge loss of a probable catastrophe conditionally distributed amongst a large audience. Risk is a measurable uncertainty.

It is important to advise on the theme of issuance using a keep working provision 'keep the Employer indemnified of' in one-go. Alternatively, there may be a reciprocal clause such as 'no cross liability claimable each other' by which the Employer covenants to save harmless the Contractor in respect of his liabilities. Secondly, it is essential to define the scope of indemnity under given insurance scheme such as for instance the subject matters for professional insurance may be errors and omissions, violation of copyright, design defects, supervision defects etc. For Contractors, they may be damage to adjacent property, workmen compensation, unsound construction, third party insurance etc. Another element is that the subject insurance must not overlap with another form of insurance on principle that the losing party can claim in no more than one insurance scheme. There can also be exclusions provided in the contract in addition to those given in the insurance policy itself. Because the clauses can also be related to the Employer sometimes, it must be clarified that the Contractor shall not be liable in respect of a few selected circumstances. These include permanent use of the Employer to execute works, interference with any right of light, airway or water or other easement or quasi easement which is the unavoidable result of the works plus injuries to persons or property resulting from any act or neglect committed by the Employer or his agents or other Contractors. Since the extent of repercussions behind these named perils is not clear, it is imperative to 'catch the tail' by stipulating the relief of damage arising out of claims and proceedings.

This invariably attaches a monetary value in place of the loss or damage sustained as a result of a peril. Also, the minimum amount of insurance is a basic concern of any insurance. Although the obligation of 'keeping validity' falls on the Contractor, the Employer takes over this obligation in case the Contractor fails to fulfil the same, subject to consequent recovery as a debt.

4.6 Sufficiency of tender

This clause must be clear enough to understand the scope of sufficiency in technical terms. The Employer, instead of obtaining a warranty, relieves from the Contractor's obligation as to accuracy and adequacy of the bid price. Secondly, it constitutes satisfaction as to comprehensiveness of the tender sum in undertaking the scope of work. However, it should not go beyond the limits such as sufficiency of the documents (provided by the Employer) for the Contractor to make a sensible technical interpretation (passing the Employer's risk to the tenderer). For instance, in lump sum contracts, a common clause is that the Contractor should be satisfied with the quantities. This unrealistically restricts the tenderness in submitting a competitive bid price since the tenderer is not in the best position to deal with omissions and errors in quantities prepared by a non-party to the contract.

In nutshell, the Contractor shall satisfy himself that the rates and prices quoted in the tender are correct and sufficient to meet all the contractual obligations for due completion and maintenance. This means that the rates quoted should be comprehensive enough to include material, labour, plant, overhead, profit and risk associated in fulfilment of the contractual obligations. As a principle, costs relating to items in the bill of quantities, which are not priced, will be deemed to have been included elsewhere in the tender price.

The sufficiency of Contractor's rates should however extend only up to works that are contracted. The adequacy of the rates and the tender can not therefore be deemed to include variations. Under circumstances, the Contractor should take utmost care in determining some of the 'pricing risks' as follows;

a. When quantities are provisional or estimated – a risk fallen on the estimator to allow likely changes during construction
b. When quantities are actual and correct – a risk fallen on the estimator to review the given quantities
c. Escalation in prices of materials and labour not allowed under contract
d. Complying with all details of drawings and item descriptions in bill of quantities (any missing items)
e. Considerations arising out of specification – no additional payment is allowed for any error or misunderstanding by the Contractor of the work involved
f. Discrepancies to be notified prior to submit the tender – an instruction to tenderers
g. Where the word 'allow' occurs, the cost of the items shall be at the risk of the Contractor – (a pricing preamble)
h. Arithmetical errors in computing tender
i. Allowances for samples and mock-ups
j. Arbitrary itemizations – (composite items measured in contrary to SMM)
k. Considerations arising out of manufacturer's instructions
l. Minor details not shown in drawings
m. Preliminaries for which a separate bill section does not exist
n. Attendance to nominated sub Contractors and directly appointed Contractors for which the scope is unknown
o. Allowances for 'any other costs and expenses' – usually being the very last bill item to cover unknown or unmeasured items

4.7 Suspension

The purpose of this clause is to provide authority for the Engineer to suspend works wholly or partially. While stipulating the source of instruction clearly, a suspension clause usually offers a wide mandate for the Engineer to decide suspension and if so, the scope of suspension, time of suspension, and the lifting of suspension. A suspension order shall remain in force until it is lifted by another order in writing. Next, the Contractor's action in such order must be stipulated, which basically include protection and re-sequencing of works and reallocation of resources to minimize impacts in time and cost. The Employer's liability to absorb time and cost implications depends on the reasons behind suspension. The reasons expressly given for suspension can be a couple of clearly distinct occasions such as provided in the contract being necessary for the proper execution of the balance works, weather conditions affecting quality and safety of works or default on the part of the Contractor. The burden of justifying any extra cost is lying with the Contractor. It is also important to specify whether this notice is a condition precedent to invoke a right to lodge a claim at a later stage. If the clause is not clear with precedence, then it will be interpreted as not losing any right.

The obsoleteness of suspension order with the passage of time is truly a phenomenon where it can not be left open for an indefinite period of time. It is therefore important to decide a time frame beyond which it becomes contractually obsolete and results in a new dimension. If the suspension order stands in force for a consecutive period of 90 days in part or in whole (including any extension of previously issued suspension orders unto 90 days), then the Contractor must request instructions from the Engineer to resume works. In case the Engineer fails to respond or otherwise notify, the Contractor shall elect to treat suspension where it affects part of the works as an omission of that part under variation clause. If the suspension is related to whole of the works then it will be considered as an abandonment of the contract. Since the consequences follow in both cases, the time frame for both notices must be stipulated along with the clause itself or in the appendix to tender by giving due reference.

4.8 Detail program

Baseline program, being the first in planning, is often resourced and cost loaded. The second is the monthly updated program/s (whether delay happened or not) which should be a routine to record actual progress and reflect the status of progress at the cut off date of submission. The third step is the revised program in case the progress seems hampered due to any reason. It is submitted in such a way that the parties can easily segregate the delays belonging to the Employer and the Contractor, showing modifications to the latest applicable program.

Monthly updates are usually a joint measurement and inspection effort at site level. The second and third programs should also reflect the Contractor's best effort in recovery and mitigation of delay impacts. A sensible prediction includes considering best effort and mitigation prior to decide on the revised date for completion.

Basic characteristics of any program are the interrelated activities taken in a sequence with a definite start and finish time subject to milestone if any within which the parties must be able to entertain some kind of flexibility to adjust the program according to their requirements as well as the changes that take place beyond their control. Having admitted this universal truth behind programming, it is essential that the contractual provisions do not bind the parties with the internal variables in a program such as float, sequence of activities and their logic. This suggests that the program is only a monitoring device, a dynamic living tool, and a forecasted way of undertaking various activities. Irrespective of whether the program is approved by the Engineer, the Contractor shall not be relieved from his obligation of completion at the right time. The premise is that the program reflects the Contractor's prerogative in organizing his own activities as long as the scheduled completion can be achieved as planned while securing its dynamism along with the progress and eventualities dictating the site operations. A due prominence is therefore weighted over the timely submission of correct program using a penalty imposition. Any clause that does impinge upon the foregoing features is harmful at all levels.

4.9 Completion and extension

An express undertaking by the Contractor (that he completed the works and is ready to take over the completion of any outstanding works and snags as identified in the inspection just before the issue of completion certificate) is an important element. Usually the Appendix to Tender provides the mode of completion (sectional, partial, substantial, practical or milestone) depending on the nature, complexity, duration, location, estimated tender value, end user interests, etc. Each individual segment can therefore be treated discretely for the purpose of time extension, liquidated damages, retention, insurance, defects liability etc. In doing so, it will avoid imposition of penalty and approval on time extension and prolongation costs, illogically.

Basically, the objectives of time extension are to prevent the time for completion becoming at large, relieve the Contractor from LD or penalty for delays beyond his control only, ascertain concurrent delay impacts on critical path, find the eligibility of the claim and if so, the amount duly compensable and establish new project completion date. Since time extension is not just the time elongation, but it involves mitigatory measures, float and concurrency, best effort and acceleration etc, the Engineer must have adequate authority to deal with these issues that might change the degree of time implications.

At the outset, it had better to specify the circumstances where the parties can offhand take for granted in a time extension, instead of leaving it open for debates in the post contract stage. Although the list may not be exhaustive, certain selected eventualities can directly establish eligibility for time extension on their concurrence, subject to fulfilment of other obligations such as timely notice, submission of detail particulars within the specified period of time or as is practicable. Generally these causes include delay by the Engineer or Employer in discharge of their obligations, delay in receipt of Engineer's consents, due to change in law, exceptionally adverse weather, delay by local government authority, named perils in insurance clauses and excepted risks, suspension of works, delay in site access and possession and acts or inactions of other Contractors. Such a list of eventualities, although not exhaustive, will at least reduce the difference of opinion as to eligibility. The limitations along with the phrase 'other special circumstances of any kind whatsoever' are incomprehensible where the Contractor entertains a wide selection of areas to claim under this provision while the Engineer is placed in an embarrassment in deciphering the right cause that would fall within the sphere of 'special circumstances'.

Although the cost implications associated with time extension are in commonplace, it is dangerous to define the method of calculating the loss sustained by the Contractor since the method depends on the availability of facts in a contemporary form. The danger behind stipulating a method in advance (say, time related preliminaries on pro-rata basis) is that it might over or under compensate the losing party. However, the clause must establish the bottom line which is the actual loss. Any method that is capable of finding the actual loss (reliance loss in accounting terms) is therefore sensible.

The other side of the token is liquidated damages. To be enforceable in law, liquidated damages must represent a genuine pre-estimate of the losses that the Employer might suffer resulting from the Contractor's delay. If not the amount indicated as liquidated damages will be construed as a penalty by the Courts and will not be enforceable, irrespective of the title assigned to it. However if the contract includes a penalty instead, it may be acceptable and legally enforceable in some jurisdictions.

Failure to grant extension of time or impose liquidated damages/ penalty when due will deny the right of the Employer to deduct liquidated damages/penalty and will also bring the doctrine of time at large into play which eventually establishes an obligation for the Contractor to complete the works within a reasonable period of time. Hence, a captured 'reasonableness' depends on a gamut of technical and economic factors. All in all, a characteristic of a good contract is to set out the Employer's precautions and contractual remedies in advance of a noticeable delay by the Contractor in order to persuade completion other than damages in a punitive sense.

4.10 Variations

Clauses related to variations are subject to a broad interpretation. The clarity in which the clause defines what constitutes a variation is of importance at the outset. Generally, a variation could be in form, quality, quantity, line, level, alignment, or any additional work which is necessary, desirable or appropriate for the completion of works. Any work that does not fall within the above definition is not a variation. For instance a change in form that is not necessary for completion would be an invalid variation. In line with this principle, additional works 'for any other purpose' vitiate the contract and creates a claimable situation for the Contractor to either object or request for an increment in the existing rates. Also, this definition does not recognize work of a substantially different nature and brings the doctrine of cardinal change into effect.

Completeness is the degree to which the clause covers all contractual aspects of a variation. This basically includes the process of measurement, valuation, and payment in a gauntlet. The degree of fairness of the clause is an element in line with good faith and fair dealing and the Engineer's authority to vary the works can not be a license to vary the contract. In nutshell, variations should be under the contract and not in the contract. Further the Engineer's authority to fix a rate in case the parties disagree can not be a unilateral judgment that brings economic duress into effect. A rate for varied work must contain a fair margin of profit. The Engineer's approach in 'due consultation' enables reaching fairness.

There should also be a consistency, which is the degree of compatibility between the variation clause and other clauses. The method of valuing a varied work is the next attribute where the degree of clarity in the stipulated procedure matters. The bottom line is that the additional or omitted works shall be valued at the rates set out in the contract. If the contract does not contain a rate applicable, then a suitable rate will be agreed or the Engineer shall fix, in a disagreement. The ground on which the existing bill rates can be revised is that if the nature or amount of any omission or addition relative to the nature and amount of the whole of the works shall be such that the existing rates in the contract are no longer reasonable or applicable.

Whenever, the quantity of an individual bill item exceeds substantially, it may render the existing rate unreasonable on technical or economic reasons. The Engineer reserves the right to revisit the rate and adjust it to make it reasonable. Another scenario is that the net impact of variations (after additions and omissions) on the effective contract sum (original contract sum minus contingency, prime and provisional sums) has been exceeded by a certain percentage. There will be a point where the Contractor has incurred more overheads than anticipated due to the irresistible amount of variations. There is a cut off limit for that, which is 15% in FIDIC, ascertained at the practical completion where the contract price shall be adjusted by a lump sum figure, a total rate revision or using new rates for selected varied work.

The whole idea is to compensate the Contractor on under absorbed overheads due to varied works that are overwhelmingly substantial in scope.

4.11 Claims

Traffic for claims has both ways (from the Contractor to the Employer and vice versa). Timely notice and response is the minimum requirement to have a claim to be validly acceptable. The Contractor shall submit once in every month an account giving particulars of claims for any additional payment to which the Contractor may consider himself entitled. If the claim has a continuing effect on the contract, he should send on interim basis followed by a final claim once the effects cease otherwise the Contractor loses his right to lodge any claims. This is condition precedence where the party claiming time and/or cost have to justify its allegations with evidence in support, basically documentary evidence that are contemporary in nature. The party who asserts must prove their eligibility for damages with contemporary records in support based on the principle of causality.

Causality (or sometimes referred to as causation or causative potency) is the extent of link between cause and effect. Once this link is not clear, then it is deemed that the issues have been inextricably intertwined resulting in a global claim. Prevention and best effort is fundamental in any claim review. The concept of actual loss recovery is also promoted all the time where the contractor is found to be compensable, instead of many other terms interchangeably used such as cost, loss and expense, additional cost, expenditure, etc. The whole idea is to bring the losing party back to the original position financially had there been no loss sustained under the contract or otherwise. The term otherwise is to cover claims arising out of common or civil law proceedings and claims. Maximum coverage on claims issues in lack of a protocol, from claims submission to review and recommendation is coupled with the correct application of cause and effect, concurrency, float availability, prevention, baseline and revised programs and more emphasis on proactive mitigatory measures, in establishing eligibility and quantum, in terms of time and cost. Rather than conditions, however, the best place to address these issues in detail is the protocol or practice manual that can make the parties binding with it. Condition precedence often take place in serving notices for Contractor's intent to claim, lodgement, approval, disagreement, etc prior to initiate the next step. (Appendix C and D provides a schedule of claims and notices respectively)

4.12 Price escalation

Source of price escalation is the start point of any escalation clause. Basically the open market price escalation is the subject of the clause 'price fluctuation' A separate clause is usually provided for the reimbursement of any loss sustained by the Contractor due to subsequent changes in legislation such as custom duty, minimum wages of labour categories in construction, for instance. The primary intention of the clause must be highlighted, therefore. A fluctuation clause is to provide a mechanism for reimbursing the Contractors for changes in input prices over which they have no control at all. The phrase 'no control at all' is in reference to unprecedented price increases not foreseeable by the Contractor at the time of tender. The premise is that it may be cheaper in long run for the Employer to pay for what did happen rather than what the Contractor thought might happen in those areas of doubt which the Contractor can not influence.

A method to deal with price escalation may allow the tenderers to overcome the risk of providing an additional mark-up for unforeseen price variations. The benefit of the doubt would then be passed on to the Employer in a deflation since the contract price adjustment is applicable in both ways. The aim behind any mechanism should be to reasonably reimburse the Contractor for those eventualities he could not reasonably foresee in advance.

Although a formula method is fairly straightforward and simple to administer, it is difficult to introduce in some countries where there is no promotional or regulatory organization to publish construction indices. Accurate input proportions and reliable cost indices are integral components in such a mechanism. Under circumstance, a traditional approach can be stipulated in an easy-to-understand manner, by removing complications traditionally associated in the administration.

4.13 Quantities

Under the titles of 'works to be measured', 'estimated quantities', 'actual and correct quantities', 're-measurement' etc, a couple of clauses has been dedicated in any typical contract to deal with how, when and by whom the measurements and valuations undertaken. The premise behind estimated quantities is to communicate the fact that quantities are liable to changes due to errors and omissions, design changes or site conditions, so that the quantities are theoretical for the purpose of establishing the contact sum and are subject to re-measurement for the purpose of payments. They are not to be taken as the actual and correct quantities required for the works to be executed by the Contractor in fulfilment of its obligations under the Contract. Conversely, the actual and correct quantities provision is to convey the message that the quantities are firm and not subject to re-measurement so that both parties are taken to have been risking any quantity changes. Hence, these two provisions promote a philosophy in valuations contrasting each other and usually a reservation is provided in the Appendix to Tender for the Employer to choose in advance whatever the method he desires appropriate. One clause is therefore optional over the other.

If stated in the Appendix to Tender that re-measurement clause applies, the Engineer shall ascertain and determine by re-measurement, or sometimes called ad-measurement, the value of work done upon verification by the Quantity Surveyor in accordance with the Contract. The Engineer or the Quantity Surveyor shall, when it requires any part or parts of the works to be measured, give notice to the Contractor for his assistance in verifying such measurement. A reasonable degree of co-operation is envisaged at all times since re-measurement is a process undertaken jointly and physically at site. Should the Contractor not assist, then the measurement ascertained by the Engineer shall be taken as the correct measurement of the relevant work. For purpose of measuring such permanent works as is to be measured by records, the Contractor shall prepare measurement records month by month at a particular cut off date and the Contractor, as and when called upon to do so shall revisit and agree to any amended records with the Engineer confirming its acceptance. If the Contractor does not so revisit and agree such records, they shall be again taken to be correct. However, a good contractual provision also keeps a reservation for the Contractor to make a reasonable objection, of course within a time frame, and with a fully reasoned notice of the respects in which such records are claimed to be incorrect.

The next dimension is the method of measurement. Notwithstanding any general or local custom, works shall be measured as per the standard method of measurement which is designated in the Appendix to Tender. However, the item descriptions and pricing preambles that must be compatible with the standard method of measurement avoid claims on errors and omissions and ambiguities and obscurities in connection with measurement and valuation.

In the case of substructure works or where the Engineer considers it necessary the Contractor shall before the surface of any portion of the ground is inferred or the works are put in hand in conjunction with the Engineer examine the site, drawings and the specifications and take such additional levels or other measurements as may be necessary. Both parties shall agree as to the surface levels with the Engineer since these surface levels once established, agreed and signed in writing before any interference shall form the basis of the measurement of permanent works.

4.14 Payment

Always, the concerns of the parties take a lead. Employers, as well as their lenders, are concerned about overpaying the Contractor before the work is completed and failing to hold back adequate retainage as security. On the other hand, Contractors and sub Contractors are concerned about prompt payment since any major gap in cash-in and cash-out may cause hardship over project financing, which may ultimately result in insolvency. Accordingly, the payment terms should be designed to have equilibrium on the parties' concerns.

At the outset, the Contractor initiates the process by submitting an 'Application for Payment' monthly, on an approved format, on cumulative basis (so that any previous error is adjustable) supported by such data substantiating the Contractor's right to payment. These include measurement sheets, lien waivers, certified payrolls, schedule updates, rate break-ups, invoices, delivery notes, and test results etc.

Albeit, the parties are left to set their own deadlines for payment, the mechanism is heavily procedural in line with the statutory requirements governing payments. Payments are conditioned on the Engineer receiving an application for payment often not later than the specified day of the month. While timely submission and payment have been contractual, review and certification have been customary. However, in some cases, the parties may be left with the residual standard in the event payment deadlines are left blank. A good payment term never compromise for delay in Employer's financing source.

Retention protects the Employer in the event of a Contractor breach or sub Contractor liens. However the amount of retention must be sufficient enough to hedge against the Contractor's breach, it must also not create too hardship over the Contractors' cash flow. Some contracts have sought to limit such inequities by imposing limitations on the amount of retention both on public and private projects. Some contracts reduce or eliminate retainage as a certain portion of the work is completed. For example, if fifty percent of the work has been completed to the Employer's satisfaction, the retainage can be reduced or eliminated totally. Other contracts exempt certain parts of the billing from retainage, such as preliminaries. Ultimately, the goal should be to balance the interests of the Contractors and Employers.

Many contracts provide with the option of determining the interest rate for late payments. A fair method is to use an interest rate that the Employer is being charged on the construction loan for the project. By doing so, the Employer would be discouraged from using the Contractor as a financing source. An interest rate that is very high may at a glance seem favourable to the Contractor. Some statues provide a default rate, which is the legal rate prevailing at the place where the project is located. Typically, this rate in most states is the same as the rate for unpaid Court judgments, which can range from five to ten percent.

Pay-when-paid clauses allow reasonable delay before the Contractor must pay the sub Contractor. On the other hand, under pay-if-paid clauses, the general Contractor's obligation does not arise until the Employer has paid the Contractor. That is, payment from the Employer is condition precedence. Courts will not view a clause as creating the latter category, unless it explicitly states that payment is a condition precedent.

4.15 Force majeure

A major function of construction contracts is to allocate risks. The guiding principles are that risks should be allocated to the party who has direct control over the process that creates the risk. Secondly, where no party has direct control, risk should be allocated to the party who is best able to protect against an unexpected loss. Finally, where no party has control, risks become the responsibility of the Employer, who is the party that initiated the construction project and presumably is the ultimate beneficiary of the results.

However, amongst the clauses related to risk allocation, the clause titled 'force majeure' takes a fourth dimension since force majeure is based on the concept that it is fair to allow a party to escape contractual obligations without fault when satisfaction of those obligations is made impossible. Neither party shall be liable in damages or have the right to terminate the contract for any delay or default in performing if such delay or default is caused by conditions beyond its control including, but not limited to acts of God, government restrictions (including the denial or cancellation of any export or other necessary license), wars, insurrections and/or any other cause beyond the reasonable control of the party whose performance is affected. Force majeure clauses are therefore applicable to performance failures caused by natural disasters (earthquakes, hurricanes, floods), wars, riots or other major upheaval, performance failures of parties outside their control (e.g., labour actions by employees of a common carrier). By way of this example, force majeure clauses exclude liability where unforeseen and uncontrollable events prevent the performance of its contractual obligations. They generally discharge a contracting party when a supervening, sometimes supernatural, event, beyond the control of either party, makes performance impossible. A common thread is that of the unexpected, something beyond reasonable human foresight and skill irresistible and over powering where the human prudence can neither foresee nor prevent.

Although many legal traditions recognize force majeure as providing a contractual right to the suspension or release of one's contractual obligations, in some contracts, the doctrine of frustration is applicable in lieu of force majeure. Force majeure shares common roots with the doctrine of frustration and these provisions may or may not overlap with the force majeure provisions given in standard forms of contract. However, hardship, inconvenience or monetary loss does not constitute frustration under English law.

4.16 Termination

It is imperative to identify the circumstances a termination is possible or would constitute. Termination for convenience clauses allow the Employer to cancel a project after the construction contract has been executed. This situation usually only happens when financing fails or a permit necessary for the project cannot be obtained. Changes in the law or technology may also make a project obsolete or the planned approach illegal. The resultant effect is that the Employer pays the Contractor its actual costs up to the point of notice of termination including demobilization costs. The Contractor may seek further compensation if any overhead costs have not yet been recovered through billings for work performed and lost profits.

The worst case scenario for an Employer is a Contractor that has stopped performing which is Employer's Termination for Cause. When all else fails, the Employer's remedy is termination of the contract. Usually, the Employer may terminate the contract if the Contractor: 1) persistently fails or refuses to supply enough properly-skilled workers and/or materials; 2) fails to pay sub Contractors; 3) persistently disregards applicable laws, ordinances or rules; or 4) is otherwise guilty of a substantial breach of the contract. Once the Engineer certifies any of the above causes, the Employer may, without prejudice to other rights and remedies, terminate the Contractor often after providing seven days' written notice to the Contractor and its surety, if applicable. If the cost to complete the work exceeds the unpaid balance of the contract sum, which is almost always the case, the Contractor is responsible for the amounts over and above the contract sum. This amount pending repayment is considered to be a debt. The phrase 'without prejudice to any other rights' assures the Employer's immunity against losses in connection with Contractor faults. However, a proper termination may have an effect on any rights to recovery under performance bonds. Obligations under performance bonds typically are not triggered unless a claimant first follows all proper procedures to terminate the contract. Failure to follow those clauses may impair a claimant's right to future performance to complete the original contract.

Another dimension is when the Contractor terminates the contract. Walking off the site when the contract has been frustrated, or job conditions may become so unbearable so that a Contractor decides to take such action. Some contracts contain a clause which provides that a Contractor may terminate if the Employer fails to make payment within a specified period upon no fault of the Contractor, subject to notice.

4.17 Dispute settlement

A 'choice of law' clause is a term of a contract in which the parties specify that any dispute arising under the contract shall be determined in accordance with the law of a particular jurisdiction. In addition, there are 'boilerplate' provisions, to fit one size in all cases, though they are not always. Typically, these provisions tell the parties how to govern their relationship and administer the contract. Although often thought to be of secondary importance, these provisions have significant commercial and contractual implications. Common provisions include the governing law provision, venue, assignment and delegation provisions, waiver of jury trial provisions, notice requirements, and force majeure provisions. If the relevant factual elements affecting formation, validity, and performance can be obvious and the contract is silent on the point, the law of the place where the contract was made will be applied as the law governing whatever substantive issues.

It is the contract that ultimately determines the fate of the parties. The parties have autonomy to make whatever bargain they want, as long as they do not prejudice the statutory provisions. Thus, in principle, the parties are free to nominate any law applicable to their own contract. There are exceptions, however.

Coverage of the dispute settlement clause can be either narrow or broad depending on what is truly desired by the clause. The phrase, "any dispute or difference in connection with or arising out of the Contract or the execution of the Works", suggests a broad coverage. The phrases "under this contract", "in connection with" and "in relation to" essentially limit the scope. The terms "in respect of" and "with regard to" afford a fairly-wide meaning and the words "arising out of" have been construed to have the widest meaning. However, as seen in many standards, the reason behind the coupling of the terms 'difference' with 'dispute' is not clear. Difference of opinion or conflicts of interest may not be a dispute; instead it might develop into a dispute whenever the parties have divergent concerns not agreeable to each other.

Sometimes, the coverage of dispute goes to the extent where the disputes "arise between the Government or the Engineer and the Contractor". Contractually, the Engineer is not a party to a traditional contract between Employer and Contractor although the Engineer may come from the Employer organization for the administration purpose. Any dispute between the Engineer and the Contractor or the Engineer's representative and the Contractor is a dispute between Contractor and Employer by definition.

Settlement clauses have been attacked as void on the presumption that the contract as a whole was induced by fraud, rescinded or terminated by its own terms. The essence of the 'seperability doctrine' is that the settlement clause is an independent agreement, separate from and independent of the remainder of the contract in which it is contained. With this logic in mind, Courts have held that the settlement clause does not 'die' with the contract containing it unless the local supreme law stipulates otherwise.

The term "finally settled" indicates that the parties intend for instance the arbitrator's ruling to be final so that a Court will not try the case de novo. In this context, "binding" means the parties intend that the award will resolve the dispute and be enforceable in Courts. It does not mean that the parties are free to disregard, but the substance of the award will not be reviewed by the Courts. Generally the phrase 'final' is to constitute finality and binding is to make implementation obligatory unless and until the parties otherwise receives an arbitral award or Court decision as a result of the next step in the dispute process, having invoked by the disgruntled party.

It is important to make sure that all the steps in the dispute gauntlet have a legal recognition since the outcome may be null and void in front of the existing law. The time frame for stepping into steps in the dispute process (to notify intent, dissatisfaction, agreement etc) must not be too economical. For instance a period of 90 days is a considerable waste of time for the Engineer to evaluate a dispute and give his judgment. Since the same issues have been tried out under different clauses (claims, variations, time extension etc) by the Engineer, a period of 2 months would be sufficient even for the worst case eventuality.

Usually, the Contractor shall proceed with the works with all due diligence. This 'keep working provision' is another important attribute of a dispute clause to establish the Contractor's obligation to continue with work pending settlement.

In some contracts, the phrase "may refer the dispute to mediation (if applicable) or to the Competent Court of Justice" leaves the parties with an option. The issue is who decides the option once the gauntlet is broken? It will be another dispute on the selection when one party wants to go the Court while the other prefers mediation. Also, if mediation and arbitration takes place in between, it has to be elaborated in detail as to how, when, why and where, i.e. is it voluntary, by a separate agreement or under expressed provisions in the contract, etc? Hence, it is imperative to create an appropriate roadmap by which the parties can resolve their differences. This process must be able to work both during construction and after completion. The most fundamental (but often overlooked) question is what type of dispute resolution process is best for the project.

The project size, project complexity, and number of parties to the project, complexity of contractual relationships, risk distribution, Employer status, and length of construction dictate the choice. After balancing such factors, it may be clear that the three tiered approach is inefficient or that litigating disputes in Court may be more appropriate than arbitration. Arbitration may ensure, however, that disputes that are technical in nature are heard by those trained in such technicalities, otherwise the award may be fully awkward non technical one.

Unless parties agree contractually or unless it is allowed under the governing arbitration rules, joinder of parties or multiparty arbitration is precluded in many jurisdictions. Yet those jurisdictions will often allow consolidated litigation. Thus, if the nature of the project will likely involve disputes between more than one party, it is important to consider whether parties would prefer dispute process that allows joinder or consolidation of claims.

4.18 Summary

Attributes connect all those involved in contractual machinery using many types of documents in effect. Beyond the parties to the contract, these conditions also stipulate duties, rights and obligations of the non parties to the contract since it is indispensable to define the connectivity of these personalities (Engineer, Engineer's representative, nominated sub Contractors, suppliers etc) in the total project delivery. However, some customized documents resulting in one-sided language harm the even risk allocation amongst the parties, thus resulting in imbalanced apportionment of project risks.

CHAPTER 5
RIGHTS AND OBLIGATIONS

5.1 Introduction

A construction contract can be termed as an agreement entered into by two parties, under the terms of which one party agrees to execute the works in consideration of the payments to be made by the other party. Construction contracts carry terms and conditions to govern their relationship which form an integral part of the entire contract.

For a construction contract to be deemed competent however, both parties must be legally capable of playing their part in the right sense within a clearly defined subject matter of the contract. Conditions of contract spell out the rights and obligations of the parties and prescribe how to act upon a given prospect. Whenever a party fails in its duties according to the contract, they are said to have breached the contract. However, not every failure can be termed a breach, as parties can always find an excuse for not performing a specific task assigned to them under the contract.

5.2 Familiarity with site conditions

Contractor's obligation starts with a site visit during the tender period and once the contract has been awarded his previous findings impinge upon his methodology in execution. A site investigation clause provides that the Contractor shall investigate the site and become familiar with the surrounding circumstances. This requirement, which is fundamental in nature, does not however negate the 'differing site conditions' clause. Instead, it merely narrows down the field of differing site conditions to which a reasonable investigation would not reveal. It is effective insofar as it may prevent a Contractor from contending that actual conditions differed from what he anticipated if the actual conditions are the ones which a reasonable investigation would have disclosed. A reasonable investigation does not require the Contractor to be a trained geologist or other specialized expert, nor does it require a Contractor to conduct technical investigations. However, the Contractor will not be able to make a claim for what it should have discovered acting as an 'experienced' Contractor viewing the site. A Contractor's failure to investigate does not preclude a claim under the differing site conditions clause. Rather, a Contractor who fails to inspect or perform an inadequate inspection bears the risk of any condition that could have been discovered by a reasonable site investigation.

5.3 Design liability

Absolutely, the Contractor is not responsible for design and specification prepared by the Engineer. If the contract requires the Contractor to undertake any design, the Contractor shall be fully responsible for that design even if the Engineer approves it. In full or partial, the Engineer's approval does not blindly relieve design liability of the Contractor. In fact, the Contractor takes a design responsibility when he uses initiative in detailing out if contract documents do not give sufficient details when his opinion is invited as to the best option of overcoming a particular problem or when he produces drawings for the Engineer's approval, any matters of design that are included may be a source of Contractor's liability.

It is implied when the Contractor obtains instructions from the Engineer related to design; he brings to notice of the Engineer of any defects in the design if he becomes aware. These circumstances limit the Contractor's design liability within the reasonable care and skill with no warranty of fitness of the design for the intended purpose. Also, in general terms when an Employer appoints an Architect or Engineer to design a building or work of a civil engineering nature, he is entitled to expect the Architect or Engineer to be responsible for all design work. This basic principle was established in the *Moresk* case[19].

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[19] Moresk Cleaners Ltd -v- Thomas Henwood Hicks (1996) 4 BLR 50.

As settled in the above case, the approval of a Contractor or sub Contractor's drawings by the Architect or Engineer will not totally relieve the Contractor or sub Contractor from liability. Employers who incur costs due to errors in design will normally commence an action jointly against the Contractor or sub Contractor who prepared drawings and the Architect or Engineer who gave approval or consent to proceed. The Court may decide on the apportionment of blame.

5.4 Obligation to execute works

The Contractor shall execute and complete the works and remedy any defects in strict accordance with the Contract, with due care and diligence. To meet this obligation, the Contractor shall provide all labour, including the supervision, materials, constructional plant and all other things, whether of a temporary or permanent nature, as far as the necessity for providing the same is specified in the contract or reasonably inferred from the contract. The Contractor shall comply with and adhere strictly to the Engineer's instructions on any matter concerning the works.

The obligation on the part of the Contractor to provide supervision, labour, materials, plant and other things necessary for due execution, completion and maintenance of works is pretty obvious in any typical contract. While completing and maintaining works with due care and diligence, the Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction. The foregoing term of 'other things' does not include everything the Engineer or Employer needs but is limited to what have been specified in the contract or what can be reasonably inferred from the contract 'necessary' for completion. Basically, the Contractor is obliged not only to complete work on time but also to carry out work diligently showing care and effort with a reasonable expedition. Also, an obligation has been usually placed upon the Contractor to give an express undertaking to the Employer that the works have been completed and ready for taking over when the 'right' time comes.

5.5 Work to be to the satisfaction of the Engineer

This is a clause laying down a Contractor's fundamental obligation under any contract. The Contractor shall execute and maintain works in strict accordance with the contract to the satisfaction of the Engineer. Although the term 'satisfaction' seems subjective, it could be measured in terms of quality, workmanship and performance as specified in the contract while the parameters established in the contract shall reduce the element of subjectivity in the Engineer's opinion. Further, the Contractor shall obtain instructions only from the Engineer and the Engineer's representative (subject to limitations applicable in the role of Engineer's representative). Such instruction can be on any matter whether mentioned in the contract or not. An element of contradiction therefore exists. Although the Contractor is bound to follow the contract in carrying out works by strictly adhering to specification etc without going 'out' of what is prescribed within the contract, he is bound to follow instructions irrespective of whether such instruction is issued under the contract or not. However, the Contractor cannot be asked to carry out works, which are legally or physically impossible. This distinction must be recorded at all times.

The Engineer ought to know that he is not empowered to issue instructions 'outside and beyond' the contract. Usually, the Contractor is relieved from his obligations under circumstances that render impossible or unlawful and as such the Contractor would be entitled to seek a technical deviation in order to fulfil his basic obligation of completion of work. In the meantime, the Engineer is empowered to issue further drawings and instructions necessary for due completion of work. The Contractor shall comply with such instructions. This clause establishes an indirect authority for the Engineer to reverse, supersede or cancel the drawings and instructions initially issued to the Contractor, which he decides necessary for proper execution and completion of work.

5.6 Custody of drawings and specifications

Drawings and specifications shall remain under the sole custody of the Engineer. Generally, two copies shall be issued to the Contractor free of charge. Further copies can be made at his own expense. At the completion of the contract, basically at the issue of taking over certificate, the Contractor shall return to the Engineer all drawings and specifications provided under the contract. Even though the contracts sometimes do not deal with the issue of copyright, it deems that the documents made by or on behalf of the Employer shall not without the Employer's consent be copied or communicated to a third party for any purpose unless otherwise permitted under the contract.

A one copy shall be kept available for the Engineer's use and inspection when required. All drawings shall be kept confidential. However, the obligation to keep the drawings confidential is not essentially restricted to those provided by the Engineer but also extended to the drawings including sketches, samples, schedules, calculations etc supplied by the Contractor despite of any approval.

This contractual provision is usually in line with the non-disclosure principle between the Employer and the Contractor that outlines confidential materials, knowledge or information that the parties wish to share with one another for a definite purpose, but wish to restrict access to by third parties. It is more or less a contract through which the parties agree not to disclose information covered by the contract and creates a confidential relationship between the parties to protect any type of confidential and proprietary information or trade secrets.

5.7 Obligation to follow the program

There are several programs mandated in a Contract. The Contractor is required to furnish together with the tender a preliminary program forming a part of memorandum of procedure. This information is essential for comparison of various offers and particularly to check whether the tenderer has made a true appreciation of the activities ensuring timely completion of work.

Within 14 days from the date of the letter of award, the Engineer expects from the Contractor an initial program for the execution of the works. It is sometimes unfair by the Contractor in considerably a big project to require this submission within a short spell of time such as 14 calendar days. However, in some contracts this requirement has been narrowed down to a level of a short program for the first three months or so, just to reflect the arrangement on mobilization, site preparatory works, material procurement etc. Essentially, with a brief method statement showing as to how the Contractor intends to take a lead in the first few months, this initial program is still a detail one covering the activities to be undertaken in the initial stage. In case the Contractor fails to comply with the time frame stipulated for this submission, then the Contractor may have to pay the Employer the sum stated in the appendix to tender as the penalty for the period lapses from the date of the letter of award to the date of submission, subject to a ceiling limit.

A detail program follows afterwards within a specified period. Subject to considerations arising out of specifications, the Contractor shall submit to the Engineer for its approval a fully detailed program for the execution of works, which is resourced and cost loaded, using the latest digital version in such a form as the Engineer shall reasonably prescribe. It will be accompanied with a detail method statement showing as to how the Contractor intends to organize the site activities and thereby achieving the scheduled completion. In case the Contractor fails in complying with the time frame stipulated for submission, then the Contractor may face penalty or liquidated damages, as the case may be.

An accurate and updated program assists in the ordering and allocation of resources. Hence, the Contractor shall within a specified number of days of the letter of acceptance, or letter of award, or letter of intent, as the case may be, submit to the Engineer a detailed program showing the order of procedure he proposes to implement on site. It enables the Engineer to make arrangements for the provision of drawings, appointment of nominated sub Contractors, discharging his duties etc. The Engineer should comment on any aspect, which he finds unsatisfactory in relation to programming, which could be related to logic, sequence, duration, constraints etc and inform the Contractor to revisit. The Contractor is obliged to submit revised programs in a delay to show how he intends to catch up delays in ensuring timely completion. A detailed program once approved is the baseline to monitor physical execution.

Monthly updated program is to reflect the true physical progress on site. Subject to considerations arising out of specifications, the Contractor shall organize a joint progress measurement and inspection with the Engineer to verify the actual start/finish dates and completed percentage of each activity in the detail program. This requirement is usually a digital update at a cut off date or at any other frequency required by the Engineer.

If at any time it appears to the Engineer that the progress of the works does not conform to the approved program, the Contractor shall produce within the time prescribed by the Engineer, a revised program, showing modifications to the approved program resulting from and identifying any matter affecting the progress of the works. The revised program so approved shall demonstrate the Contractor's best effort in the recovery and/or mitigation of delay impacts. The submission to and approval by the Engineer of any program and/or imposition of penalty shall not however relieve the Contractor of any of his obligations under the Contract.

The SCL protocol in UK recommends that the Contractor should submit a programme as early as possible in the manner and sequence in which the works are to be performed, and should apply equally to smaller projects. It further recommends that the parties reach an agreement on the programme, in particular to the form of the programme, the interaction with the method statement, the time within which the Contractor submits a draft programme for acceptance and the requirements for updating and saving of the accepted programme. The parties should also agree on the software to be used to produce the programme and the records to be maintained for delay analysis.

The whole idea is to keep the Contractor responsible for detailing out a program that is sufficient in detail to enable the Engineer in order to assess the progress of the works, and to implement and modify the program where significant deviations take place. The Contractor should seek approval of his program and in the absence of an express requirement to seek approval; he can prepare and amend his program at his own discretion. However, if amendments are made without gaining the approval of the Engineer, or in the light of Engineer's objection, then the Contractor is deemed to have probably taken up implications associated with it.

In nutshell, both the site and the work programme belong to the Contractor. It is the Contractor's prerogative to use his best approach to organize his own resources, method of execution, etc as long as he demonstrates his ability to achieve scheduled completion and milestones if any. A construction program in line with the typical S-curve would be a thumb rule for a provisional approval, anyway.

5.8 Contractor's superintendence

Supervision throughout the project by employing competent and authorized persons approved by the Engineer is an obligation by contract. The Engineer can withdraw such approval at any time and the Contractor shall then as soon as practicable remove the person from the works and replace such personnel by another suitable substitute on approval. The Contractor shall not employ any disqualified personnel again in any capacity.

The Contractor is therefore obligated to employ capable persons to provide supervision, on full or part time basis, as the case may be, ensuring effective presence on site operations. This condition has a relationship with a part of memorandum of procedure of the tender submitted, where the Contractor is to list out the in-house staff including management in the required capacity within the tender who will be available during the progress of work. The submission of the list of personnel and their deployment on the project is mandatory irrespective of whether such a list has been provided in the tender.

A question is whether the Contractor reserves the right to withdraw any approved person. It is implied however the Engineer's approval is required even when to withdraw an approved person as it is tied up with the condition that the Contractor shall deploy skilled and experienced technical staff to supervise works and all necessary labour for proper execution of the project. The Engineer is therefore entitled to object to anybody he considers misbehaved, incompetent, negligent or undesirable and order the Contractor to forthwith remove such person in order to avoid interrupted progress on site. People who disregard site safety are considered to be undesirable. Under circumstances, this contractual provision offers the Engineer wide powers with a view to ensure quality and safety of work. The Engineer's entitlement to object applies to anybody of the Contractor's staff including managers, supervisors, sub Contractors and suppliers.

5.9 Care of works

Construction contracts include an obligation, whether express or implied, to perform works in a reasonably skilful and workmanlike manner. Generally, the Contractor must perform in a manner consistent with the degree of skill and efficiency normally displayed by those of ordinary skill and competence in the trade or business in question. Failure to perform in a workmanlike manner may not only relieve the Employer from payment, but may result in damages being recovered from the Contractor.

Care of works is all about work discipline from the use of right tool by the right man to erect and maintain proper scaffolding to ensure safety at all times. The Contractor is fully responsible for care of works till completion of all or part of works as the case may be including any outstanding work, which he intends to finish during maintenance period. The Contractor is to rectify at his own cost any damage to the works before they are taken over unless caused by one of the Employer's risks such as war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection, military or usurped power, civil war, riot, commotion or disorder.

Also, the Contractor shall reinstate all properties that are damaged during works, whether they are in public or private possession. The Engineer shall advise the Employer on the circumstances the Employer reserves the right to employ another Contractor to rectify damaged works whenever the Contractor fails to do the same promptly.

Further, the Contractor is obligated to keep the site in an orderly manner ensuring safety by taking all reasonable steps to protect the environment on and off site to avoid pollution and nuisance as a consequence of his method of operation. This is a duty of care imposed by common and civil law provisions. The Contractor is paid for taking necessary safety and security measures as a part of his obligations under preliminaries such as lighting, watching, fencing etc. It is basic tenet established that the Contractor is obliged to keep the site neat, tidy, clean and free of debris. This obligation includes timely disposal of all surplus materials and temporary works subject to final inspection and approval of the Engineer. In the meantime, the Employer owned materials, equipments, temporary works and any other excess stuff shall be handed over to the Employer at the practical completion.

5.10 Accurate setting out

While the Contractor is responsible for setting out its work and for errors in so doing, the Employer is obliged to give to the Contractor the correct information which it needs in order to set out the works. The Contractor is wholly responsible for accurate setting out of works irrespective of whether the Engineer has approved it or not, unless the setting out is based on incorrect data supplied by the Engineer in writing. The Contractor will be reimbursed for subsequent rectifications owing to incorrect setting out on no-fault of the Contractor and will be expressly required to comply with all statutes including local government regulations in force related to construction setting out.

5.11 Adverse physical conditions and artificial obstructions

Construction contracts set forth the rights and obligations of the parties when conditions encountered during the performance of the work differ from those which were envisaged at the time the parties entered into the contract. The three most common contractual provisions are the 'differing site conditions' clause, which creates a right to claim; the 'site investigation' clause which limits the right to claim; and the 'disclaimer clause' which attempts to prevent any claims.

Typically, in FIDIC, the Contractor is entitled to additional costs and time extension for delays resulting from physical conditions or artificial obstructions, except climatic conditions, not reasonably foreseeable by an experienced Contractor. JCT 80 and 81 in re-measurement forms effectively place much of the ground condition risks on the Employer. In contrast, some standard forms place the risk of unforeseen and unforeseeable sub-surface conditions on the Contractor regardless of whether the Contractor was misled by insufficient or inaccurate information, which is an extreme case.

A provision in FIDIC exists that the Contractor shall propose alternative measures to overcome the obstacles and their cost implications together with any intention to claim cost and/or time overrun. Keeping the Engineer informed of such occurrence is usually a condition precedence imposed on the Contractor's right to claim additional cost and/or extension of time. Further, the Contractor is to comply with any instruction issued by the Engineer to overcome the obstacles or to take reasonable measures. Also, the Contractor shall not cover, bury or remove such obstacle until so instructed by the Engineer except in urgency to reduce risk of injuries or damages to persons or property.

The purpose of this provision is to give the Contractor a remedy in case he comes across an adverse physical condition and artificial obstruction while in progress. However, many clauses expressly demarcate that the weather related causes are not falling within the purview of this provision. It is also inferred that special circumstances falling within the time extension clause or force majuere clause do not also fall within the ambit of this provision. It is therefore important to lay down which circumstances fall within this clause and how adversity is measured in a physical condition to dissect and isolate the events from events eligible under the contract for time extension and/or compensation. For instance, curfew declared by government is literally a man decided outcome so that it is artificial and it hampers the progress. Hence, it can be reasonable to infer by custom that this provision is related to below ground construction works where the Contractor may come across boulders, subsidence, power lines, sewer lines etc.

In all cases, foreseability is the deciding criterion for compensability, measured against the time of tendering and experience of the Contractor. The concept of foreseeability has been used for over a century as a legal test for liability. It is a concept used to limit the liability of a party for the consequences of his or her acts to consequences that are within the scope of a foreseeable risk, which of course embodies a subjective standard, i.e. the way the Engineer decides. The test of entitlement is foreseeability, i.e., that which is foreseeable by an experienced Contractor does not qualify whereas that which is not, and which was not actually foreseen, does. However, this clause involves subjectivity to a greater extent and the Engineer's power has been wide in all respects. Both the Contractor and the Engineer have a role to play upon immediate notice by the Contractor. It may also be incomplete if this clause fails to address the repercussions in time and cost and who bears it and links to other provisions to deal with subject matter.

5.12 Opportunities for other Contractors

The Contractor is bound to provide facilities and services for the other Contractors who have been appointed by the Employer and to the Employer's personnel and the personnel of any legally constituted public authorities. This obligation is either specified in the contract or instructed by the Engineer. The Contractor shall be entitled to reimburse the cost of such facility or service and to an extension of time if such facility or service caused a delay in the execution of work.

By affording all reasonable opportunities, the Contractor shall co-ordinate his own activities with other Contractors while permitting the use of his temporary access roads, scaffolding, plants and any other service of whatsoever nature, as the circumstances genuinely allow for uninterrupted progress in all contracts. Unless otherwise specifically stated in the contract, the Contractor owes a moral obligation to extend a reasonable degree of cooperation for the other Contractors remaining at site.

5.13 Obligations as to materials, labour and plant

All materials should be of respective kinds as specified in the contract. Specifications lay down the minimum standard in terms of the type and quality of materials to be used, the level of workmanship and performance to be achieved.

All materials and workmanship will be tested by the Engineer irrespective of the place it is manufactured or fabricated, either on site or off site. In testing as a basic obligation, the Contractor shall provide facilities to test materials and machinery and shall supply samples before use in works for testing as may be selected and required by the Engineer. If any test is ordered by the Engineer which is not intended by or provided for or so particularized, the cost of such test shall be borne by the Contractor if the test results show that the materials or workmanship is not in accordance with the contract as specified.

If the Engineer orders that the test should be carried out by an independent entity at a venue other than the site or the place of manufacture, in the case of test under load or to ascertain the correctness of the design in order for the Contractor to be liable for the cost of the test, the test must not only be intended or provided for in the contract but must also be particularized in the contract. If the Contractor fails to particularize this test then the question of which party should bear the cost depends on the outcome of the test. There will usually be a number of implied terms that the works be fit for the purpose for which are intended, that the goods be of merchantable quality, that the materials, unless otherwise specified, be new, and that the workmanship be performed to a standard of reasonable care and skill.

Tests on completion are a Contractor's general obligation. The Contractor shall give to the Engineer a notice for his readiness to carry out each of the tests as required by the contract. In considering the results of the tests on completion, the Engineer shall make allowances for the effect of any use of the works by the Employer on the performance or other characteristics of the works. As soon as the works, or a section, have passed any tests on completion, the Contractor shall submit a certified report of the results of these tests to the Engineer.

Basically, the Contractor shall make his own arrangement for engagement of labour including transport, housing, feeding and payment, provide adequate supply of water, not import, sell, barter or dispose alcoholic liquor or drugs, not give, barter or otherwise dispose arms and ammunition, consider all nationally recognized festivals, days or rest and religious and other customs, comply medical regulations in an outbreak of illness of an epidemic nature and take all reasonable precautions to prevent unlawful riotous or disorderly conduct. The Contractor is responsible for the observance by his sub Contractors of the above provision. Also, the Contractor shall deliver to the Engineer's representative at monthly intervals a return in detail in a form showing supervisory staff and labour employed and construction plants deployed.

Some conditions require that all machinery and equipment, which is installed and incorporated as part of the permanent works to be manufactured by those companies having local agents. The purpose of this clause is in two fold; it is easy in repairs and regular maintenance thus time and cost saving to the Contractor and it encourages Contractors to purchase machinery and equipment locally.

Plant shall mean constructional plant, temporary works and materials brought for temporary works. Vehicles engaged in transporting labour, plant or materials to or from site are not considered as 'Plant' for the purpose of this provision. All plant, goods and materials owned or hired by the Contractor when on the site are deemed to be the property of the Employer and are to be for the exclusive use of the works. However, the Contractor shall not bring to the site any hired plant unless there is an agreement for the hire which contains a provision that the Employer committing to make direct payments to the Employer on the similar terms in all respects had with the Contractor. This clause is applicable in the event of a forfeiture (except the Employer shall be entitled to permit the use of other Contractor's plants) in order to secure continuity of work upon the request of the Employer in writing within a specified period after forfeiture.

The sums paid and the expenses incurred in entering into an agreement for hire of plant in order to enable continuity of work are deemed to be part of the cost of completing works which will be considered in the valuation at date of forfeiture. The Employer shall make direct payments to plants that are hired and hire purchased and deduct or recover the same from the Contractor in order to avoid seizure.

Removal of plants is also a concern in some contracts where the Engineer has been authorised to prevent the Contractor in removing any plant without written consent of the Engineer. Such consent shall not be unreasonably withheld where the same is no longer immediately required for completion of work. However, the Contractor is obliged to remove all plants used in site at the completion of work as a part of site clearance. In case the Contractor fails to remove any plant, goods or materials after completion of work within a reasonable time, two options are generally made available to the Employer; either sell any plant belonging to the Contractor or return to the Employer of the plant at the cost of the Contractor. If the proceeds of sale are insufficient to meet the cost on sale, the excess shall be considered a debt due from the Contractor to the Employer.

Another important consideration is the section of routes for site operations. The Contractor shall use every possible means to prevent highways and bridges during transport of materials, plants etc and shall select and use routes to minimize traffic. Special protection or strengthening will be carried out on the approval of the Engineer in routes where necessary before transit special loads, which is aimed to avoid damage to roads and its structures and to minimize traffic on the road due to construction vehicular movement.

Adjoining properties is also a concern taken up in many standard forms. The Contractor shall bear all consequences if his operations are carried out in such a manner that interfere the 'neighbourhood' unnecessarily causing inconvenience of the public, access to use and occupation of public or private road, footpaths or properties whether in possession of the Employer or any other person.

5.14 Inspection of operations

The Contractor shall afford every facility and assistance in obtaining the right to access for workshops, fabricating yards, stores etc and the cost to the Engineer or Employer acting on this provision is not a cost to be borne by the Contractor, unless otherwise stated in the contract.

For the purpose of inspection and measuring of work to be covered up such as foundations, pipelines etc, the Contractor shall give notice to the Engineer that the works are ready for inspection. The Contractor shall not put such work out of view before inspection and approval. If re-opening of any covered part of work as required by the Engineer, then the Contractor shall do so and reinstate the uncovered work. The cost of uncovering and reinstatement will be borne by the Employer if it is found that the work has been carried out in accordance with the contract.

5.15 Obligation of timely compliance

A prudent Contractor will promptly intimate to the Engineer of any changed circumstances in support of grounds for subsequent actions without delay. This includes obtaining explicit authorization from the Engineer prior to perform a variation unless the variation is simply an increase or decrease of the bill quantities, the net result of which is not substantial. The Contractor should also get instructions confirmed in writing as soon as practicable and assist the Engineer in ascertaining the cost likely to be involved in a proposed variation. If the work is to be carried out on urgency at least a log book entry is made when it was made impracticable to deliver price statements to the Engineer as required by the contract for the day works carried out.

Conditions of contract generally mandate the Contractor to convey his intent to claim extra payment or a varied rate, perhaps within a number of days as specified, before work is commenced, or at least as soon as practicable after date of instruction, which can be aptly called the 'earliest practicable opportunity'. The Contractor shall furnish the Engineer all receipts and vouchers to prove the amounts paid and submit quotations for approval before ordering materials. He shall deliver each day an exact list in duplicate names, occupation and time of all workmen and a statement of material and plant employed in day work together with a priced statement of labour, plant and material used at the end of each month which has been fully and punctually rendered. If the variation causes delay, he shall request a time extension and document the claim in the next immediate monthly account. Therefore, timely compliance is sensible at all times.

5.16 Obligation on shop drawings

Shop drawings are the manufacturers' or the Contractor's drawn version of information to explain the fabrication or installation of the items to the site crew. Shop drawings are often more detailed than the information shown in the contract documents to give the Engineer the opportunity to review the fabricator's version of the product, prior to fabrication. Shop drawings carry notes of changes or alterations to the drawings and specifications needed to fabricate the product, indication of dimensions needing verification from the jobsite and placement or erecting information such as interface, tolerance levels etc.

Usually there is a pay item for shop drawings. The Contractor in preparing shop drawings has no way of even partially ignoring the design intent set out in the contract unless he brings notice to the Engineer of any impracticability. The issue is whether the Contractor did something extra in rectifying design errors or omissions or anything apart from the above scope where the Contractor is entitled to a reasonable remuneration for his additional inputs.

5.17 Obligation to proceed with work

Standard forms of contract often contain 'keep working' provisions to ensure continuity of work obligating the Contractor to proceed diligently with due performance, even with the issues pending resolution. However, this is not to be an 'undated cheque' for the Employer to induce continuity on work, particularly when there is a delay in the 'Employer's inputs' badly needing for on-going works.

Indeed, the Contractor can not simply remain redundant till for instance the prices have been negotiated and agreed in a new varied work without commencing at the right time as per the instructions. Neither the Contractor can delay the start of work in connection with variation till they get the rates agreed in writing. Even the Engineer can give verbal instructions and the Contractor should not await till he gets it formally in writing in order to start work, rather he should confirm the recognition of such instruction in writing to the Engineer, and immediately proceed to carry out such instructions. If such confirmation is not contradicted by the Engineer, such instruction is deemed to be a formal instruction of the Engineer, albeit a deadline is not specified. Hence, the conditions are clear enough establishing the validity of the Engineer's order to commence work.

Contractors however feel hesitant to start work without getting prior approval on the cost because of the fear of not getting the full entitlement in a protracted payment process. The date ever first the Contractor received verbally any instruction may be taken as the effective date of instruction, unless any other date considered for planning purposes.

5.18 Contractor to apply best effort

Since a failure to perform may cause it to be in breach of the contract, one possible solution is to require only that the party expends a certain amount of effort to attain the objective. As long as the required amount of effort is made, the performing party will not be in breach of contract, even if the objective is never actually achieved. What should that standard of effort be expected in the contract? A common belief is that 'best effort' is the highest standard of effort that can be required of a party in undertaking an obligation. However, FIDIC makes the best effort obligatory on the part of the Contractor in mitigating delays and in maintaining a reasonable rate of progress. Accordingly, the Contractor shall continue to use his best endeavours to complete works unless and until the contract is terminated under circumstances, which financially or otherwise materially affect the execution of works. Best endeavours means that all reasonable steps to achieve the objective of timely completion taken genuinely upon the circumstances involved.

This may basically include technical measures such as re-sequencing of work, de-erecting, remobilising, accelerating etc as long as the effects of those measures are kept to a minimum. As it does not however contemplate the expenditure of a substantial amount of money, the term 'best effort' must be construed objectively.

5.19 Improper works and urgent repairs

When observed, the Engineer shall order in writing to remove unsuitable materials from the site. The Contractor shall substitute suitable materials failing in which the Employer is entitled to employ and pay another Contractor to carry out such an instruction. This is tied up with the requirement to observe the required standard of work stipulated in the contract so that the Contractor should immediately correct such situations without waiting the Engineer's order to do so since the use of improper materials apparently results in inferior quality of work. The tendency to incorporate a contractual provision enabling acceptance on inferior quality work as a variation is not only promoting bad practice but also giving a licence to vitiate the fundamental obligation of quality compliance. Therefore, this clause particularly authorizes the Engineer to take appropriate actions at critical events during construction. However, many contracts are silent on the remedy available to the Contractor if the removed material is subsequently found to be in accordance with the contract.

Also, if the Engineer considers that urgent works is necessary for the safety of life, works or adjoining properties, the Contractor shall institute immediate action. A reasonable degree of cooperation is highly expected in urgency. In case the Contractor is unable or unwilling to carry out such work, the Employer may use any other Contractor and deduct his costs from the Contractor if the Contractor was responsible for the cause of urgency. It further reiterates that the Engineer shall promptly notify such a necessity to the Contractor.

The Contractor shall confine his operations to the site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as working areas. During the execution of the works, the Contractor shall keep the site free from all obstructions, and shall store or dispose of any Contractor's equipment or surplus materials. The Contractor shall clear away and remove from the site any wreckage, rubbish and temporary works which are no longer required.

The Contractor shall leave the site and the works in a clean and safe condition. However, the Contractor may retain on site, during the defects notification period, such goods as are required for the Contractor to fulfil obligations under the contract.

5.20 Defects liability

Defects are those imperfections, shrinkages, undulations, or even bad staining on a textured surface. They could be due to poor performance combined with the use of inferior quality materials and poor workmanship due to use of unskilled labour. Further these defects include deferential settlement in sub structure, structural cracks in concrete elements etc that threaten the structural integrity and stability of buildings. Basically, they can be deficiencies in the design itself, or the materials used, or in workmanship.

As such, the Contractor's obligation from the beginning is to carry out and complete the works in a proper and workmanlike manner as shown on the contract documents, save to the extent these are varied. If defects occur during this time, the Contractor must remedy those for which he is liable at no extra cost. In addition, the Contractor will be responsible if the need to remedy these defects causes delay to the project. In undertaking this obligation, the Contractor has to choose materials that are fit for purpose. Workmanship must be to the standards prescribed in the contract and to the satisfaction of the Engineer. Since practical completion is considered to be the point of time the works are reasonably ready for their intended use, (even though there may be an outstanding snags) all works must be free from patent defects. Accordingly, the Contractor's responsibility for defects has been in existence all along with the works in progress, although there is a period dedicated for maintenance.

The Contractor has the obligation, and indeed the right, to remedy defects appearing within the period of maintenance, at no cost to contract. However, the practice is to the benefit of both parties since the Contractor would otherwise be liable for the greater cost of another Contractor remedying the defects. Also a provision for the making good defects within this period does not deprive the Employer of his damages for defects appearing outside that period nor will it serve to extend the time allowed to the Contractor to finish the works correctly. When all defects, shrinkages and other faults have been made good, the Engineer shall issue a certificate to that effect.

With the issue of completion certificate or the partial or milestone completion, as the case may be, the Contractor starts undertaking the defects liability on a guarantee bond. Defects liability period, sometimes called maintenance period, is different from the period allocated for maintenance of specific plants such as sewerage treatment. A period of contractual maintenance is therefore dedicated for rectification of defects identified in the works executed and for minor outstanding works that has been categorically assigned for their completion during the maintenance period.

The Contractor's obligation to rectify defects during the maintenance period does not permit him to postpone the defects rectifications up until the end of the said period. Instead, the Contractor should notify the Engineer his arrangements so that the Engineer after due consultation with the Employer shall provide a reasonable degree of cooperation for the Contractor to attend to defects with minimal disturbance. Equally, the Contractor has an obligation to undertake his defects rectifications without causing disturbance to the Employer's occupation or operation.

The Contractor shall, if required by the Engineer, further search for the cause of any defect, under the direction of the Engineer. Unless the defect is to be remedied at the cost of the Contractor due to cause of the defect as confirmed, the cost of the search with a reasonable profit as agreed or determined by the Engineer shall be included in the Contract Price.

If the defect or damage cannot be remedied expeditiously on the site and the Employer gives consent, the Contractor may remove from the site for the purposes of repair such items of plant as are defective.

This consent may require the Contractor to increase the amount of the performance security by the full replacement cost of these items, or to provide other appropriate security.

5.21 Fossils, etc

The Contractor shall immediately notify the Engineer's representative of any discovery of material suspected to fall under the provision of this clause such as fossils, coins, articles etc having antique, geological or archaeological value and interest which is deemed to be the absolute property of the Employer.

The Contractor shall take all precautions to preserve such finding and adhere to the instructions for subsequent actions such as disposal etc at the cost of the Employer. It is implied that any substance having a significant commercial value found in excavation is a subject matter falling within this category.

5.22 Patent rights and royalties

The Contractor is responsible for violation of patent rights, trademark, design, name or other protected rights in respect of any plant, material used for and in connection with the works. The Contractor may however intimate the Employer and Engineer of such violation due to use and compliance with the design or specification and lodge his claim to absolve any of his obligations that might arise.

5.23 Employer's obligation to give site possession

The Employer shall give the Contractor right of access to, and possession of, all parts of the site within the time stated in the Appendix to Tender. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the specifications. However, the Employer may withhold any such right or possession until the performance security has been received.

The Employer has a duty to give to the Contractor possession of so much of the site as may be required to enable the Contractor to commence and proceed with the execution of the works in accordance with the programme referred to as the baseline, and give to the Contractor possession of such further portions of the site as may be required to enable the Contractor to proceed with the execution of the works with due dispatch. Site means the land and other places on and under, in and through which the permanent works or temporary works designed by the Engineer are to be executed, and any other land and places provided by the Employer for working space or any other purposes as may be specifically designated in the contract as forming part of the site.

Also, the Employer has a responsibility to provide access to the site, for instance in a road widening project enabling the Contractor to timely perform its obligations under the contract and, on a project involving multiple prime Contractors, the Employer has an implied duty to coordinate the Contractors' work to avoid substantial interference between Contractors causing unreasonable delays.

5.24 Obligation to make timely payments

Non payment is a breach of contract. The Contractor has the right to suspend work if payment has not been met by the due date and no withholding notice has been issued. A 7 days notice of intention to suspend is usually given in many contracts. However, sometimes, if the money claimed is indeed due, contracts allow the Contractor to suspend works until final payment is made providing that 7 days notice in writing is given, stating the ground upon which it is proposed that suspension be made. If suspension is exercised in the proper manner, the period during which parties have suspended is disregarded when calculating the time limits of the contract. However, suspension would be the last resort of a prudent Contractor before abandonment in case of a non payment. Obviously, the consequences associated with the non-payment differ from those of the delay in payment.

5.25 Adequacy of plans and specifications

There is an implied warranty as to adequacy and sufficiency of plans and specifications provided by the Employer. Where the plans and specifications do not adequately depict the actual conditions on site, Courts may employ the breach of the implied warranty to allow the Contractor to recover additional expenses that would have reasonably sustained in overcoming a site condition. To recover on a breach of warranty, the Contractor must be able to show reliance on the Employer's warranty. As per the doctrine of superior knowledge, the Employer must disclose 'vital' information in its possession not otherwise available to the Contractor at the time of bidding. The Employer's failure to disclose superior knowledge constitutes a breach of contract, once the vitality, superiority and its failure has been established.

In line with this principle, the Employer has an obligation under many standard forms to make available to the Contractor with the tender documents such data on hydrological and sub-surface conditions obtained and note it is such data in their fullest extent with no omissions.

Although there is no duty to disclose material facts before a contract is made, contract *ubrrimae fidei* (of the utmost good faith) are an exception to this rule. Such contracts can be avoided unless there is a disclosure of material facts by the representor. The reason for this is that in certain types of contract, one party has exclusive knowledge and therefore is bound to tell the other party everything that may affect the latter's judgment. Another reason for having to disclose material facts in contracts *ubrrimae fidei* is that in certain situations there is a special relationship of confidence which imposes upon the party possessing the relevant knowledge, a duty of disclosure. All contracts of insurance, contracts for the allotment of shares in companies and in some instances, contracts of suretyship and partnership are *ubrrimae fidei.*

5.26 Duty to share all material information

The Employer has an implied duty to share all known material information that would be useful for the Contractor to properly bid and execute its work. Thus, in *Valentini v City of Adrian*[20], although the plans and specifications contained a disclaimer that the soil borings provided by the City Council were only 'evidence' and that the bidder "himself must assume entire responsibility for any conclusions he may draw," the Michigan Supreme Court held that the City Council was liable for the Contractor's additional costs.

Thus, one who undertakes to erect a structure assumes ordinarily the risk of subsidence of the soil. In absence of differing site conditions or changed conditions clause, Contractors may increase the amount of their bid proposals (to cover the contingency of encountering unexpected difficulties), make their own subsurface investigation, bear the risk of unknown conditions without price contingencies, or choose not to bid at all. Some Courts take into account the Contractor's dilemma in undertaking "tremendous[ly] expensive core boring tests not knowing whether or not he [will] get the contract." Courts have recognized some exceptions to this general rule, however.

For instance, a sub Contractor at the bid time had asked the general Contractor's project manager if there was a soil report. The project manager indicated there was no soil report, but advised that his opinion is that the soil is 'excellent' and only on-site material would be needed for the project. When works started, the characteristics of the native soil made it impossible to meet the compaction specifications that made the sub Contractor import material from a borrow pit off site. The sub Contractor then learned that the general Contractor possessed a soil report identifying the precise conditions that had been encountered by the sub Contractor. The sub Contractor completed the works and sued for delay and intentional misrepresentation of the site conditions (the subcontract did not contain a differing site condition clause). The Court held that since the project manager had made an affirmative and unequivocal representation on which the sub Contractor relied and had wilfully withheld material information of which it had superior knowledge, the sub Contractor was entitled to recover the increased costs incurred as a result of those misrepresentations.

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[20] Valentini v City of Adrian, 347 Mich 530 (1956). 10. Id

Accordingly, the implied warranty of sufficiency of plans and specifications is inherently a part of the bargain that exists within the contract. The leading case for the implied warranty of the plans and specifications is *United States v. Spearin*[21] where it was established that the Contractor's recovery under the implied warranty of the specifications is dependent upon proof that the defective specifications caused the performance difficulties and that the Contractor reasonably relied upon the specifications. These factors are determined by analyzing the information available to the Contractor and the Contractor's 'know-how' at the tender, presuming the Contractor is experienced in the subject works.

Claims based upon breach of the implied warranty of specifications will not be successful if the Contractor had actual or constructive knowledge of the defects prior to the contract award. A Contractor will also not recover under the theory of implied warranty of specifications, if it does not adhere to the specifications, if it uses the specifications after having learned of their deficiencies, or if its increased costs are not caused by the defective specifications. As per the spearin doctrine, a Contractor will not be liable to the owner for loss or damage which results solely from insufficiencies or defects in such information, plans and specifications.

In the spearin case, the Contractor contracted to build a dry dock in a Navy yard where the Contractor had to relocate a portion of a sewer which crossed the specified site. The owner, which happened to be the United States Government, provided the plans and specifications. Nearly one year after the relocation of the sewer, a dam in a connecting sewer caused the relocated sewer to flood and burst, thereby flooding the area excavated for the dry dock. This dam was not shown on the owner's plans and specifications. The Court held that the owner created an implied warranty that, if the Contractor complied with the plans and specifications, the relocated sewer would be adequate. The Court further held that the general clauses requiring the Contractor to examine the site and the plans and to maintain responsibility for the work until completion did not overcome the implied warranty.

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[21] United States v. Spearin, 248 U.S. 132 (1918)

In addition to the implied warranty of accurate plans and specifications, there was another implied warranty that they must be suitable for their intended use. An owner breaches the first warranty when the actual condition of the site is not as the owner has stated (e.g. if there is a dam in a sewer which is not on the plans and specifications). An owner breaches the second warranty when a Contractor accurately follows the plans and specifications to completion, yet, even so, fails to produce a finished project suitable for its intended purpose or satisfactory to the owner.

5.27 Summary

The main function of the conditions of contract is to spell out the rights and obligations of the parties to the contract on principles of risk allocation. Basically, the risk falls on the entity which is in the best position to deal with it. Risks that are beyond control of either party shall be usually a subject of insurance. Apart from rights and obligations, there are duties expressed by the contract and implied by custom. It should therefore be noted that in addition to specific contract clauses, there is an overriding legal duty on the part of both the Contractor and Employer to honour, and not to breach their respective contract obligations. Such obligations include not only those expressed in the written terms and conditions of the contract, but also those obligations necessarily implied as a matter of law and/or custom. For instance, it is an implied term of the contract that the Employer (and the Engineer on its behalf) is under an obligation to act at all times such as not to hinder or prevent the Contractor from completing the works in accordance with the terms of the contract. Should the Employer breach its contract obligations, the Contractor is entitled to compensation in damages. Such damages may represent a parallel or alternative right to payments due to be paid under the terms of the contract or an additional and separate right to be paid compensation for loss and damage incurred as a result of such breaches of the contract.

CHAPTER 6
ENGINEER AND ENGINEER REPRESENTATIVES

6.1 Introduction

The 'contractual' Engineer could be anyone designated as the Engineer under the contract. As per clause 1 in many standard forms, the Engineer and his representatives (assistants and inspectors named under FIDIC versions to represent the Engineer) are two different personalities. The Engineer's representative is appointed by the Employer to perform the duties delegated under the contract between the Employer and the Contractor. It is the Engineer who shall notify such an assignment of duties and delegation of authority to the Contractor in writing indicating the extent of authority to act as the Engineer's representative. The duties of the Engineer's representative are basically to watch and supervise works, and test and examine materials to be used and workmanship employed in connection with the works. However, the Engineer's representative has no authority to relieve the Contractor of any duties or obligations except as expressly provided in the contract, order any work involving delay or extra payment, and make any variation.

6.2 Nature of consultancy

A common source of Engineer's representatives is the consultancy contracts which are basically bi-lateral. The Employer and the consultant enter into an agreement for the delivery of a consultancy service in the discipline under concern. These consultants are often placed under the umbrella of Engineer's representative. Similar to construction contracts, the procurement of consultancy services has been largely governed by standard conditions for the subject engagement; be it soil investigation, quantity surveying, design development, supervision or any other expertise. The consultant once appointed is required to undertake the said services with due diligence. Usually a table of services at each stage of the project development (such as defined in RIBA plan of work) forms an integral part of the contract and the services at each level will be assessed against a lump sum or unit rates as agreed.

The total delivery of services has been set out in accordance with the number of professionals under each category of disciplines and the period of time of their deployment, when it comes to post contract level. For pre contract, the total delivery depends on the type of service. For instance, a conceptual design may involve several design options, each having different cost and time profiles, for the Employer's choice sometimes in a design competition. A lump sum quoted for the entire service may include the architectural, quantity surveying and planning inputs in addition to managerial resources.

Accordingly, the price for consultancy services at the pre contract stage differs within a considerable tolerance compared to construction bids. This is particularly because of the price of a professional varies with many factors including qualifications, industrial exposure, total experience in number of years, and unfortunately the nationality or the passport. The latter is a gross discrimination.

6.3 The position of the Engineer

The Engineer's position has been varying with the standard form of contract as well as the terms of engagement with the Employer. The Engineer is sometimes the Employer's representative or his agent and in some cases the clerk of work. A classic example to decide one's position under the contract is when a varied work occurs, where every one has a role to play.

The Engineer shall convey notice to the Contractor of his intention to vary a rate and fix suitable rates for varied work when ever a bill rate is no longer applicable. The Engineer's duty is to check the basis of the Contractor's submission and its evaluation (whether on existing bill rates, rates on pro-rata basis, star rates, day work rates etc), though it is apparently the quantity surveyor's remit. Further, the contract provides that in absence of contemporary records to support evaluation, the Engineer shall make his own assessment based on information available to him, as reasonable and proper, having regard to the circumstances. He shall also notify the Contractor of new rates arrived or agreed with a copy to the Employer while ascertaining the effective contract sum for the net effect of all variations. This is important in amending the amount exceeded by a certain percentage of the contract sum after due consultation with the Contractor in order to compensate the unabsorbed overheads. Also, the Engineer shall confirm verbal order before or after carrying out variation and contradict the Contractor confirmed verbal order if necessary before it becomes a variation order. He shall also keep alert on anticipated variations and their likely financial and schedule repercussions while assessing cost and time implications including loss of profit for omitted works. Apparently the quantity surveyor's sphere of activity has been hided in the role of Engineer, by contract.

In the event the Engineer being required in terms of his appointment by the Employer to obtain specific approval of the Employer for the execution of any part of his functions, such requirement shall be set out in the particular conditions. Any written instruction or approval given by the Engineer's representative to the Contractor within the terms of such delegation shall bind the Contractor and the Employer as though it had been given by the Engineer. However, any failure of the Engineer's representative to disapprove the work or material does not harm the Engineer's power to subsequently order pulling down, removal or breaking up such work or material of inferior quality.

The form of appointment of the Engineer by the Employer is a separate contract, the details of which are generally not disclosed to the Contractor. The Employer does, however, require defining any particular clauses to which specific approval of the Employer is required before the Engineer can act upon. The Employer does not guarantee the employment of that Engineer for the duration of the works, and should he so wish, may appoint another Engineer and notify the Contractor in writing.

The Engineer's right to exercise some powers delegated to him by the Employer can be contestable. The Employer shall appoint the Engineer to carry out the duties assigned in the Contract. The Engineer's staff shall include suitably qualified Engineers and other professionals who are competent to carry out these duties. However, the Engineer has no authority to amend the Contract. Of course, the Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be usually set out in the Particular Conditions, so that the limits of power and authority has been known to the Contractor as well. This is particularly important to the Contractor since the Engineer is the only source of instructions to the Contractor. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under the contract.

If the Employer intends to replace the Engineer, the Employer shall, not less than 42 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the intended replacement. The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars. This is what FIDIC recommends most of the times.

A misunderstanding is that the Engineer can issue any number of variations for any purpose. Even where a contract includes the usual variation clause there may be circumstances which could lead to additions or changes introduced by the Employer which fall outside the variations clause where the payment for the change should be on a quantum meruit or fair valuation basis. It can be argued by the Contractor that this is not a variation to the works within the confines of the contract but a separate contract in its own right, because the additional work were so peculiar, so unexpected and so different from what was contemplated by the contract.

The SCL protocol considers that adjudicators, judges or arbitrators should, so far as practicable, put themselves in the position of the contract administrator at the time the Employer risk event occurred in determining whether the Contractor is entitled to an extension of time. The Engineer is appointed to protect the interests of the parties if his role is very independent. The Courts take the view in the absence of wording to the contrary that a contract has been entered into under which the Contractor undertakes to carry out and complete the works in accordance with the terms of the contract. This is paramount and no action on the part of the Engineer should water down this obligation.

6.4 The position of the Quantity Surveyor

Although quantity surveying has been in existence as a subsidiary task of the traditional Engineer, it is a separate discipline in its own right reserving autonomy. Cost management, evolved as a practice, profession and a science, being the primary function of a Quantity Surveyor, applies in construction at various circumstances. However, no standard form of contract that places direct authority to establish costs, values, rates or prices for varied works for instance. It is the contractual Engineer that obtains authority to issue variation orders which result in the expenditure of beyond a specified net value of contingency, for instance. Any variation order in excess of such a percentage requires Employer's approval prior to its issue. The Engineer shall make any variation necessary and appropriate under the contract and not in the contract itself. i.e., the Engineer is also not empowered to issue variation orders beyond the limits imposed by contract otherwise such order could be challenged by Contractor or Employer. However, whether the Quantity Surveyor is acting in capacity of the Engineer or Engineer's representative depends on the terms of engagement with the Employer.

6.5 Consultant's claims against the Employer

There are claims on the delivery of additional services, additional staff, variance in the nature of the services due to Contractor's scope increase under variations, open market price escalation, change in the original deployment schedule, rate enhancement for individual professionals, and prolonged services due to time extension of the contract between the Contractor and the Employer, etc. Also, the changes in codes and regulations resulting in abortive work, waste of resources, re-work of design and redrawing are a source of claim under design contracts.

Of many valid provocations, the subject design changes are bit of controversial in character whenever the additional design inputs are neither easily identifiable nor measurable. Where the Engineer instructs design changes then it may be a direction to change or modify the design parameters involving type, size, or nature of the materials for incorporation. The Engineer's decision to put into effect a design change may be as a consequence of either a discovery of a defect or omission in the original design, unavailability of materials specified in the tender, further improvement in the original design or a change or modification necessary on some default of the Contractor or even sometimes the only available remedy to catch up the Contractor's delay.

Modifications on the existing design due to revision of the existing standards or codes of practice may also establish a valid ground for additional inputs. The Engineer may consider approval in the event the designer proposes design changes for the Employer's benefit as a design optimisation. The Engineer may also make due changes in the design in order to avoid outright condemnation, demolition of work done, or to bring works back to technical compliance.

Hence, the impact of design changes needs to be evaluated case by case in order to assist with the judgement as to the amounts compensable or recoverable. Though some changes may bring in "benefits" to the Employer in long run, most changes, if not managed properly, will result in "negative" impacts, most likely resulting in time and cost overruns. In general, upper-stream changes have larger impacts.

It is therefore important to establish a benchmark in the tender itself so that the subsequent changes can be comparable and quantifiable to some extent. A proposal to achieve this goal is to obtain two tender inputs; namely design intent and level of resources. The design intent includes the design approaches, strategies, parameters, and hypothesis underlying the whole design effort on the originally envisaged scope. The level of resources is the type and number of expertise (e.g., architects, planners etc), number of man-hours and the rates under each stage (conceptual, preliminary, schematic, detail etc). Of course, this proposal is not all-fit-in method of evaluation, but would at least serve the purpose of measuring the cost on wasted or additional deployment on resources in pursuit of a design change.

6.6 Employer's claims against the consultants

Claims by the Employer against the consultants have been based on errors and omissions, design defects, supervision defects, copy right violations, violation of third party rights etc. A basic tenet is that the consultant has to keep the Employer indemnified against these allegations not only during the currency of the services but also a considerable period even after close-out of the construction contract.

Also, the Engineer is under liability in the issue of variation orders, particularly the concessions granted for the Contractor. Even if the Engineer's permission for a change is fully authorized, the Engineer is not freed from his general duty to the Employer to exercise reasonable care and skill. If the change does later cause the Employer a loss, the Engineer may face reciprocal claim from the Employer. Since in practice the concessions are often made informally on site, it is rarely a practical proposition for the Engineer to take elaborate contractual precautions.

In considering professional negligence issues relating to quantity surveyors, it is useful to consider the various types of services generally provided by quantity surveyors, including estimating and cost planning services, preparing bill of quantities, and many post contract services. The objectives of the quantity surveyor are to be fair to all the parties to the contract, to comply with the professional code of conduct and to act with competence. The primary aim is to secure the Employer's objectives, which require properly prepared documentation, to reduce or avoid disputes and to continuously exercise financial control in the interests of the Employer, ensuring best value for money.

Negligence claims on quantity surveyors could be based either in contract or tort similar to the instance where an architect undertaking any work in the way of his profession accepts the ordinary liabilities of any man who follows a skilled calling. The simple theory is that the consultants are bound to exercise due care, skill and diligence, which does not mean to have an extraordinary degree of skill or the highest professional attainment. But they must bring to the task they undertake the competence and skill that is usual among others practising their profession in parallel. In case the consultant fails in these matters and the Employer thereby suffers damage, the consultant is liable either by contract or in tort.

A quantity surveyor may also owe a duty of care to third parties, if his negligent act could result in damages or loss to any of them. In other words, there should be a relationship of proximity between the negligent act and the damage or loss for negligence liability to arise and this relationship should not be a remote one.

Errors and omissions are a frequent source of claim by the Employer. However, not all the errors made by quantity surveyors during the course of their work will amount to negligent acts. In a very old court case[22], there was an arithmetical error of a quantity surveyor, because of which the principal suffered a loss of £118 in a £12,000 contract. Because the error was relatively small in relation to the value of the contract, the Court did not make a finding of negligence in the quantity surveyor's work. However if there were many errors or if the error was significant and was one involving final payment to the Contractor, which cannot be corrected as in the case of final payments, the Courts may declare negligence of the findings.

Provision of misleading estimates is again a source of claim. If the quantity surveyor knows that the client has certain financial limits for his building project, the duty to exercise reasonable care requires that he considers whether the limit is likely to be exceeded and to warn the client well in advance. This is why in some cases; there may be a need for quantity surveyors to qua1ify their estimates of costs with known technical and economic limitations and hypothesis. For example, a cost plan for a developing project at the inception stage must portray its approach taken by the quantity surveyor with the records made available to him.

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[22] Waghorn v. Wimbledon Local Board, (1877)

Quantity surveying is not an exact science and there is always a tolerance in the outcome for instance a preliminary project estimate may fall within an acceptable accuracy limit, say 10%. This requires lot of fortitude in exercising skilled judgment in order to address random factors which are incapable of precise measurement. The indeterminate nature of these factors makes it impossible to gauge them with complete accuracy in every instance. Because of the inescapable possibility of error which inheres in these services, the law has traditionally required, not perfect results, but rather a skill and judgment which can be reasonably expected from similarly situated professionals. As such, an occasional slip or error may be insufficient to sustain an allegation of professional negligence against him but the Employer may invoke the professional indemnity insurance covering errors and omissions.

6.7 Measure of damages

Whether a claim for professional negligence is brought against a quantity surveyor in contract or tort, the measure of damages will be based on the principle that the plaintiff claimant must be put so far as money can do it in the position that he would have occupied if the quantity surveyor had properly discharged his duties subject to the proviso that if the claim is in tort the plaintiff is entitled for compensation. The measure of damages as illustrated by this principle is that they must be reasonable and necessary and the plaintiff claimant is under a duty to mitigate his loss. Usually this requires the quantity surveyor if he is found negligent and responsible for the loss and damage caused to the plaintiff claimant to pay the plaintiff the monetary equivalent of the benefits he might have been deprived and to indemnify him against any expenses or liability, which he might have incurred.

6.8 Employer's recompense

Due diligence is always an express obligation in contracts. There is always a duty implied in a contract to serve the Employer with reasonable care and skill in the delivery of services. It is also an important element in the code of conduct that the members should meet the standards of professional competence and in the areas of documentation, accuracy, timeliness etc. It is incumbent upon the members to provide their client with the professional guidance necessary to make an informed decision. Thus, even without reference to any standard form of engagement, the duty to act with reasonable care and skill is covered one way or the other.

However, it is necessary to prove the breach of this obligation and the resultant financial loss. An estimate which proves to be incorrect in itself will not provide the Employer with a right of redress. The Employer must demonstrate the quantity surveyor warranted the accuracy of the estimate and the estimate was unrealistic simply because of incompetence and/or carelessness.

Liability for pure 'financial losses' resulting from careless commitments will be incurred on the basis of foreseeability of harm only if there is some relationship of proximity between the giver and the receiver of the opinion or advice. In addition to foreseeability, there must be evidence that the relationship between the parties was such that the defendant assumed a duty to take care in making opinion or advice.

A landmark case on the liability for negligent statement is *Hedley Byrne*[23]. This case established that if a person possessed of skills to provide advice gives information knowing that some other person will rely on that advice, he owes a duty to take reasonable care in expressing that opinion. Thus the existence of some type of professional skill that makes reliance on an opinion reasonable, and the factor of reliance is necessary to create a duty of care.

Also, the approach in *Donoghue v. Stevenson*[24] has been applied to create liability based on foreseeability when a professional opinion causes physical harm. This was further highlighted in the English case of *Clayton v. Woodman & Son (Builders)*[25] where a firm of architects were held liable for injuries sustained by a bricklayer as a consequence of negligent professional instructions given by them.

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[23] Hedley Byrne & Co Ltd v Heller & Partners Ltd [1964] AC 465

[24] Donoghue v Stevenson AC 562 (1932)

[25] Clayton v. Woodman & Son (Builders) Ltd [1962] 2 QB 533

6.9 Professional indemnity

Professional liability is the liability to the Employer and third party arising from the exercise of a profession. Professional liability insurance is normally purchased by the consultant under annual policies with the limit of indemnity 'floating' over the whole spectrum of his activities. Insurers restrict indemnity in respect of any one occurrence and in the aggregate to all claims made under the policy during the policy year. Therefore, unless the indemnity is replenished following a claim, the indemnity available for claims from a specific project may be less than the policy limit due to the partial erosion of that limit by previous claims, pending or settled on the same or another project.

For large projects, Engineers (equally applicable for other consultants in deployment) can purchase professional liability cover which will remain in force throughout the period during which the Engineer is engaged on the project and which will provide ongoing protection for a number of years beyond completion, subject to an aggregate limit, however. The Engineer may have a contractual liability, which would not be covered under a normal professional liability policy, since this only indemnifies where a breach of professional duty can be proved. Hence, in respect of such contractual responsibilities, the Engineer will have an uninsured risk exposure.

The liability for professionally negligent acts, errors or omissions does not cease with the completion of works or even with the issuing of final acceptance certificates. Occasionally a professional liability cover is provided on an 'occurrence' basis and will respond to claims even after the policy has lapsed, provided negligence was committed in the specified period whilst the policy was in force. But the indemnity will be limited to whatever amount was in force (and has not been exhausted by other claims) for that year.

Most professional liability policies are written on a 'claims made' form. They will respond to all claims made during the policy year regardless of the time when the negligence itself occurred. But apart from limited 'discovery periods' they will not protect the Engineer once they have been allowed to lapse or renewal has been refused by insurers.

6.10 Decennial liability

In decennial liability, a design professional takes a risk of compensating the Employer of a building for any total or partial collapse, usually for a period of 10 years, after delivery of the works. The extent and the period of liability differ according to the civil or common law provisions in addition to the contract under consideration. Decennial liability is not exactly strict liability, but it comes close. Decennial liability includes any defect that threatens the stability or safety of the building and liability extends beyond the building to include the land on which it is built. Not included in the law are minor defects.

Decennial liability represents a very uncertain exposure for design firms for a number of reasons, including the lack of precedence in the interpretation of the law such as what trigger events are meant. A joint nature of the potential liability with the Contractor is often a case where decennial liability comes to a standstill. A cause of structural failure in a building for instance might not necessarily fall on one end, but it may lie in between design defect and unsound construction for which the Contractor must be partially liable for the cause. This apportionment of blame is contestable in law.

Although decennial liability claims can be rooted in negligence, the concept goes much further. The burden of proof is not on the Employer of the property, but on the design professional to prove that the collapse or defect arose out of an event that could not have been prevented, such as a major natural disaster in line with the legal principle known as force majeure.

As stated, the Contractors and design consultants are liable, without fault, for the cost of rectifying structural defects that appear in a building or structure. Although contractual liability (e.g. for negligent design or defective workmanship) is something that the Employer takes the burden of proof under building contracts, it is not necessary to prove any negligence or breach of contract if the subject matter falls within the purview of decennial liability. Various civil and common law provisions define the extent of decennial liability in that no fault is necessary in order for liability to arise. The trigger events can be in a total or partial collapse or a defect threatening the stability or safety of the structure where the Contractors and consultants are jointly and severally liable. This liability exists irrespective of whether the collapse or defect is caused by sub-surface conditions or that the building owner approved the defective work. Also the structures, the life cycle of which is less than ten years, attract liability for the duration of that life cycle. In some civil codes, the agreements purporting to exclude decennial liability are void. Both the Contractors and consultants are unable to pass the risk down to its sub Contractors and sub-consultants.

Under circumstances, the decennial liability falls outside the scope of standard cover provided by a Contractors' all risks policy and professional indemnity insurance. Decennial liability itself is a matter for a separate insurance scheme where the level of indemnity must be sufficient to meet the losses caused by a structural defect that might extend up to a stage of a structure having to be demolished and rebuilt. Although some Courts are prepared to apportion the blame between the Contractor and consultant and between the main Contractor and its sub Contractors, the bottom line is that each of them will be liable to the building owner regardless of where the fault lies. Decennial liability issues must therefore be assessed on case by case basis.

6.11 Collateral warranty

A collateral warranty is a contract which gives a third party rights collateral to rights in an existing contract entered into by two separate parties.

For instance, an engineering firm undertakes a structural design of a high rise building for a property developer. That developer intends to sell the block of flats to a local government entity. Due to privity of contract, the engineering firm would normally only be contractually liable to the client should defects arise. The collateral warranty establishes a contractual relationship between the government entity and the engineering firm against structural defects.

Collateral warranties, are therefore duty of care deeds, emerged outside any contractual relationship between claimant and defendant, since there is no general duty of care to avoid causing defects in buildings (or products) which could cause economic loss to persons who acquire or use them. Collateral warranties therefore serve two main purposes. The first is to afford a right of action against the Contractor and the design team, if the investor incurs losses as a result of their failure to carry out their contractual responsibilities. The second is to provide a right to step in (a right to be substituted for, or to nominate a substitute for, the investor) if the investor defaults under the facility agreement or what is called forward sale and funding agreement, before the completion of the development.

6.12 Summary

It is clear that no party other than those to the contract can amend the contract. To be precise, the Engineer can not act in *ultravoirs* but protect the interests of the contract rather than the interests of the Employer. Under any circumstance, the Engineer or his representatives can not take the Employer's upper hand and take unilateral decisions. In fact, many recent standard forms of contract require the Engineer to consult the Contractor as and when required by the contract prior to make any determination. There is always a duty implied in a contract to serve the Employer with reasonable care, due diligence and skill in the delivery of services. Various instruments provide indemnity to the Employer in consultancy lapses in varying degrees and are dictated by statutory provisions apart from individual contracts.

CHAPTER 7
INSURANCE AND BONDS

7.1 Introduction

Insurance is a form of risk shifting primarily used to hedge against a contingent loss. Insurance is defined as the equitable transfer of the risk of a loss, from one party to another, in exchange for a premium, and can be thought of as a guaranteed small loss to prevent a large, possibly devastating loss. In line with this principle, construction insurance has a definite period of validity from commencement to the end of defects liability or even afterwards, in a specified sum of money with a limit of liability for a defined set of subject matters such as damage of property, materials, plants and equipments, workmen healthcare and so on. Risks are inherent in any construction, at different magnitude and frequency levels, and the consequences of which are often shared, mitigated or absorbed by the parties, subject to reservations under the contract. Basically risk is a measurable uncertainty. As any typical business assumes risk however, sharing pains and gains over business risks are not essentially the risk management in the context of construction.

There are three golden rules. Of course, the entity that is in the best position to control the risk should bear the risk burden. Secondly, if possible, risks that cannot be avoided should be mitigated. Finally, risks that cannot be controlled should be transferred using an insurance scheme. Insurance is because the risk is unbearable alone and the parties have no control over it. In construction, insurance transfers the risk of defined unforeseen events from the Contractor to its insurers. Insurance is taken in joint names, that are Contractor and the Employer, to be severally bound before an insurable risk event fallen allowing any of them to seek indemnity for injuries that are contributed in partial.

7.2 Risk function

Some risks have been expressly identified and allocated to the Employer for instance in an act of God once sustained both the cost and time would be borne by the Employer. Market vacillations over the contract period are a risk on board taken over by the Contractor when there is no adjustment on price escalation allowed under the contract. However, the risk allocation largely depends on the stakeholder interests.

Stakeholder interests are varying and sometimes contrasting. Risks related to Contractors are much more than anyone else to bear in some cases. Research reveals that tight project schedules have been the most significant risk among other factors, which infers that an appropriate schedule at the outset is never more constructive to the project delivery. As the time and cost are always closely correlated, a lengthy schedule will undoubtedly wreck the project cost benefit. Also, many unforeseen factors encompass construction activities, which often results in time and cost overruns.

Insurance agreements are generally subject to contract law principles. The words used should generally be given their ordinary meaning and policies are interpreted in the light of their commercial objectives. An exact insurance coverage will vary from contract to contract and in practice there is neither standard construction insurance policy nor a protocol applicable in the construction sector.

The following though is what might be described as a fairly typical insurance clause used in locally treated FIDIC versions in many contracts:

"*The Insurers shall indemnify the Insured in respect of loss of or damage to the Insured Property described in the Schedule whilst at Site during the Period of Insurance arising from any cause whatsoever not hereinafter excluded*".

Phrases, such as 'in respect of' and 'from any cause whatsoever' suggest that the insurance policy is comprehensive enough to include a wide coverage of benefits. The burden of proof will also assist the Contractor, simply because it is the Contractor who has the burden of proving that his claim falls fairly within the insurance coverage but it is the insurer who bears the burden of proving that an exception applies.

However, care must be taken to identify the claims under insurance from claims under the contract.

Assuming a contract awarded on the basis of site data, the Employer later accepts it turns out to be inaccurate which necessitated the Contractor changing its piling design, due to unforeseen ground conditions, at a cost of many millions. Who bears that cost? Is it the Employer, who bears the responsibility for the inaccurate site data which could not be verified, or the Contractor, who accepts responsibility for having foreseen all difficulties and costs of successfully completing the works? The answer is unclear, although, presumably, the intention must be that the Employer is to bear the extra cost. However, there might also be no provisions for the Contractor to be paid any extra money in the above scenario. The Employer may be responsible, but it does not apparently have to pay.

In another case, a switch gear for an electrical substation which was delivered to site but not yet installed got damaged by particularly a heavy rainstorm that seeped into the building. The issue was whether the cause of the damage is water or the storm? Further is it possible that the damage was caused by a failure to properly protect the components? The true cause of the loss for the purposes of an insurance claim is not forever the last cause but the dominant or effective cause.

7.3 Bacardi case[26]

M/S Bacardi had subcontracted the bottling of Bacardi Breezers to Thomas Hardy. Bacardi supplied most of the constituents, although Thomas Hardy was required to supply CO_2, which it bought from Messer. Unfortunately Messer supplied CO_2 contaminated with benzene, which was inadvertently introduced into the Bacardi Breezers. Once the contamination was discovered, the drinks were recalled and losses in excess of GBP 2 million were sustained.

Amongst the facts, the contract between Hardy and Messer included a limitation of liability clause which sought to limit Messer's liability for physical damage at GBP 500,000. In an action for breach of contract, Messer attempted to rely on the exclusion clause and argued that the introduction of benzene damaged the concentrate mixture. The Court of Appeal decided that this exclusion can not apply. The court stated that although it might be possible to speak of the mix of Bacardi concentrate as having been damaged by being admixed with CO_2 contaminated with benzene, the more natural view is that the mix of concentrate and water ceased to exist and the finished product came into existence at the moment of such admixture. What resulted was not damaged concentrate and water but a defective new product.

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[26] Bacardi-Martini Beverages Ltd v Thomas Hardy Packaging Ltd *(2002) 2 Lloyds Rep 379*

Bacardi case could be subject to criticism. For instance, what would the position be if a separate ingredient was added by mistake or what if the concentrate was deliberately contaminated and the contamination was discovered prior to the completion of the manufacturing process? The starting point with any insurance claim is therefore to identify the cause of the loss. This is sometimes harder than it seems because a particular loss might have more than one cause and their impacts considerably differ.

7.4 When it is design and build

In another unrecorded case, parties have been struggling to identify the immediate cause of flange joint failure inside a final effluent pump room; whether it is a design error, supervision defect, unsound construction or simply the flooding into the pump room. Since it was a design and built project, the decision as to the cause of defect and the extent of liability has been a more complicated one. The Contractor is liable for the improper design, use of bad quality materials and poor workmanship. The Contractor has not technically proved that there is no design error.

There were two isolation valves to isolate the FEPS (final effluent pumping station) from exiting TSE (treated sewer effluent) line (one is located adjacent to the existing STW's gate and other is next to the FEPS). If the valves were closed and isolated the FEPS from exiting TSE line, joint failure inside the FEPS could have been avoided. The Contractor's liability also extends to implementing QA/QC procedures including protecting the on-going works at site. As if the cause of joint failure is owing to high pressure in the shared header or pressure surges due to opening or mishandling of the isolation valve by operator, the liability of failure would fall on another party.

Maintaining and operating the existing TSE line is within the scope of operator whose task is to operate those valves in routine maintenance. Accordingly, as an experienced Contractor, the Contractor should have taken due care to protect his own work by closing the valve next to the FEPS. The Contractor can not be excused merely on his statement that open valve was not the cause because it was in the operable position since a long time.

Risk of flooding is insured under the Contractor's all risks policy and the Contractor's ability to recover his losses depends on the aforesaid causes. Accidental flooding due to joint failure as a result of mishandling the isolation valve by operator or due to some other reasons as discussed above cannot be considered as the Employer's risk. In a way quite drastically, all risks except Employer's risk can be taken as the Contractor's risk.

There was a knock on effect due to this incident on the project completion by 120 days since tests on completion can not be commenced until the commissioning of the whole facility. Therefore, to be fair by the Contractor, he was excused by 120 days as if it caused by a third party.

Where there are two causes and it is not possible to identify a single dominant cause, the loss will be covered by the policy if one of the causes is insured. However if one cause is expressly covered and the other is expressly excluded, the loss will be generally excluded. On a practical level, it is vital to ensure that the cause of the loss can be identified and objectively proved. In construction cases, this might require expert evidence.

7.5 Employer's risks

It is the Contractor's responsibility for damage caused by riot or commotion in a case where his employees including those of sub Contractors are solely concerned and where it arises from the conduct of the works. Use or occupation by the Employer itself constitutes an excepted risk whether or not a certificate of completion has been issued. Situations over which the Contractor has no control can be collectively referred to as excepted risks including the operation of the natural forces. Unforeseeable events are events that make the execution of the contract wholly or temporarily impossible and are of such import that it can not be overcome.

The Contractor shall be under no liability by way of indemnity or otherwise for damage to the works, to property belonging to the Employer or third parties, injuries to people and loss of life in war. The Employer shall indemnify the Contractor against all claims and expenses as a consequence of war.

Excepted risks have been identified in some contracts as special risks. Special risks shall mean exceptional event or circumstance which is beyond a party' s control, such party could not reasonably have provided against before entering into the contract, having arisen, such party could not reasonably have overcome and, is not substantially attributable to the other party. Conditions generally allow a contractual opportunity to the Contractor to claim increased cost on works or incidental to works arising from special risks.

If works, materials (on, near or in transit to site) or any other property of the Contractor used or intended to be used in the works sustain destruction by a reason of special risk, the Contractor shall be entitled to payment for any permanent work, materials destroyed (cost plus profit) and costs on replacing or making good such materials or other property used or intended to be used for works.

7.6 Mitigating risks

Causing a project to deviate from its defined plan is a measurable uncertainty. While risk in a project environment cannot be totally eliminated or transferred, it can be monitored and minimized or mitigated wherever possible. As a process, the objective of risk management is to minimize the impact of unplanned incidents on a project by identifying and addressing potential risks before significant negative consequences occur. It essentially incorporates the identification, analysis, and management of project risks. Of these functions, risk mitigation is the process of combining loss prevention and loss control to minimize a risk. Since construction projects are prone to cost and time overruns, waste and abuse, risk mitigation has become an implied obligation with the idea of reducing the severity of likely loss.

Accordingly, the Contractor shall continue to implement mitigatory measures at his level best in completing works at the margin of zero accidents unless and until the contract is terminated under circumstances (outbreak of war) for example, which financially or otherwise materially affect the execution of works. Best endeavour means all reasonable steps to mitigate the impacts upon the eventualities come across which may essentially include re-programming and accelerating works while keeping the effect of any matters which could cause delay down to a minimum. It does not however contemplate any expenditure of a substantial amount of money that overrun the budgeted sum.

7.7 Contractor to keep the Employer indemnified

In general, indemnification clauses should be mutual in nature (they should apply equally to both parties). One party should not escape liability arising from its own negligence at the expense of another party that is without negligence; and one party should not be asked to undertake a risk while another party is in a better position to control the same.

This is why the conditions of contract offer a wide coverage on the issue of insurance. The Contractor's overall insurance obligation apparently starts even before the tender is submitted. Those who intend to tender will be granted permission by the Employer to enter upon the site for inspection only on the express condition that the tenderer shall release the Employer against all liability in respect of injury and damage to persons and property.

The Contractor is to insure typically 115 percent of the full replacement value of works to cover reinstatement including demolition, removal etc together with materials for incorporation into the works.

7.8 Contractor's all risks insurance

Contractor's risk policies come in two general types; all risk policies and named peril policies. Named peril policies are narrower in scope than all risk policies, and provide coverage only if a specified event results in property damage. All risk policies are more inclusive, but are usually limited by named exclusions. Additionally, no Contractor's risk policy covers non-fortuitous loss, which is generally defined as an intended loss or a loss over which the insured had control. Finally, a loss must be physical damage to property in order to be covered. Included in most policies is the coverage for loss or damage to the property of others for which the Contractor could be liable.

Contractor's all risks insurance covers loss or damage to contract works, own plant, hired-in plant, and tools. It will cover loss or damage to materials when any of the on-going works are damaged. It will also cover loss or damage caused to the plant of Employer including his machinery, tools, and equipments. Contractors all risk insurance also provides cover for theft, loss, or damage to machinery, equipments, tools which are hired in plants from outside like hire yards. Some insurers extend this insurance to cover loss or damage to hand held power tools. Machinery insurance provides protection against any type of loss or damage to most of machineries and equipments like cranes, earth moving equipments etc. This insurance is especially useful for construction industry where a lot of machinery exposed to rough field conditions on routine basis.

Commercially, a total cap on liability is the best way for a Contractor to limit its total exposure. Some standard form of contracts, particularly those used in the plant and process sector, contains express caps on the total loss. FIDIC holds the view, in recommending terms for turnkey contracts, that there should be a total limitation on the Contractor's liabilities, which can be agreed at any level by the parties if they so wish, but otherwise will default to the contract price. FIDIC also recommends that certain specific risks are not subject to this cap. Third-party indemnities and intellectual property infringement claims fall outside the cap.

Other form of limitation is consequential losses. It is consequential losses which may be the most unpredictable and, on certain projects, the most significant, depending upon the circumstances. Often, those who refer to consequential losses are particularly keen to exclude loss of profit, but the Courts have held that loss of profit may be a direct loss, at least in some cases. Without definition in the contract, the Courts generally allow claims for direct losses to be all those 'arising naturally' from the breach of contract, the first limb of the landmark *Hadley v Baxendale*[27].

In *Skanska v Egger*[28], Skanska disputed that the obligation on Egger to insure the works against all loss and damage from whatever cause for which the Contractor is responsible under the contract extended to an obligation to insure for damage caused by defects in the floor slab. Considering the nature of the construction contract and the commercial purpose of the insurance, the Court held that the obligation to insure under the contract in question only required Egger to insure for accidents on site which would normally fall on the Contractor to repair under the general obligation to take care of the works. It did not extend to an obligation to insure for defects. Accordingly, any physical loss and damage is to be distinguished from defects in design, workmanship, materials and goods for which the Contractor is expressly liable under the contract.

7.9 Damage to persons and property

The Contractor shall indemnify the Employer in respect of injury to any person or physical damage to property of third party resulting from the execution of works subject to the following exceptions in which case the Employer shall indemnify the Contractor.,

a. permanent use or occupation of land by works or any part
b. right of the Employer to execute the works
c. unavoidable result
d. act or neglect of the Employer.

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[27] Hadley v Baxendale (1854) 9 Exch 341

[28] Skanska v Egger (2002) BLR 236

The Employer's staff including the Engineer, Engineer's representative and other consultants are not personally liable for their acts, omissions and defaults to the Contractor.

Usually, the insurance provisions imply that the Contractor shall not generally interfere with the supplies and services of the Employer or another authority on site of whatever nature such as electricity, oil, water, gas, telephone, buried cables and sewerage etc. The Contractor shall inform forthwith in case of damage and be responsible unless such services are not shown in any record which either the Employer has put at the Contractor's disposal or as a prudent Contractor would have no reason for suspecting any presence of such services.

7.10 Third party insurance

The Contractor shall indemnify the Employer and his representatives maintaining a third party insurance against loss or damage to any property whatsoever including that of the Employer resulting from or as a consequence of the execution of works, unless arising through a fault of the Employer.

The Employer, his consultants and their representatives have right of access to the site for furtherance of their duties. Liability for loss or damage to road vehicles used by the Employer/consultants as a consequence of the execution of works rests entirely with the Contractor and must be covered as required by the contract. Vehicles belonging to or in possession of the Employer, the consultants and their representatives when in use within the site premises must be a subject matter for a third party insurance. The Contractor shall therefore obtain a third party insurance prior to commence works in the sum of amount stated in the appendix to tender per single accident effective for an unlimited number of accidents. There are exceptions, however.

7.11 Employer to effect insurance

On major projects, the Employer himself may keep project insurance in effect to cover all kinds of insurance over the entire project. The rationale has been the economies of scale and the desire to ensure, for the Employer, that all relevant insurances have been in effect and that no particular losses might fall between the gaps of the respective insurances.

The Contractor shall require that the sub Contractor maintains insurance indemnifying the Employer and produces to the Employer on demand proof that the insurance is currently valid. If the Contractor fails to keep the insurance policies valid, then the Employer may keep the insurance valid and deduct the amount so paid by the Employer as premium from money due to the Contractor. The non-payment of insurance premium is considered as a non-compliance with this clause and cost incurred by the Employer is treated as a debt due from the Contractor.

Generally, nothing in the insurance clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities and responsibilities. However, if the insuring party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the contract, and the other party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring party. Apart from the contract, an insurance policy is legally enforceable and in effect under seperability doctrine.

7.12 Due performance

A major risk for a party under a construction contract is that the performing party fails to complete its obligations. Such situations can arise in main contracts as well as subcontracts. The obligation is to complete whole of the works in accordance with the contract. If the Contractor fails to perform, the Employer may be left with the difficulties of first protecting and making safe the site and then of finding another Contractor to take over and complete the works, or of completing the works itself. The Employer will be left with the prospect of a significant financial burden and delay to the project. Recovery from the Contractor will involve legal action with further additional expense.

The Contractor is therefore required to obtain and furnish the Employer within a specified time period of the Letter of Acceptance a performance bond which shall be valid till the end of defects liability, generally in the sum of 10% of the contract sum, as a guarantee for due performance of the contract. Sometimes, the conditions impose the Contractor to enhance the value of the performance bond whenever the total work done exceeds a certain cut off limit. This can be done through an endorsement or effecting a new bond.

7.13 Why bonds

A bond that is interchangeably used with the term 'guarantee' is basically an undertaking from the bondsman to pay a sum of money to the employer without reference to the liability of the contractor. It is this principle which underlies a true "on-demand" bond. A secondary obligation is when the bondsman's liability to pay the employer is contingent upon a breach by the contractor of the underlying contract. So if the employer cannot establish a breach by the contractor then the bondsman has no liability to pay. These are conditional on-demand bonds, the conditions of which may include a statement that the contractor is in default, followed by a warning notice and an adjudicator's award. Hence, it simply places hurdles in the way of a claim.

Bonds are primarily to protect against the Contractor's insolvency. But the contract documents contain a format of a performance bond followed by a note which the Employer asks the Contractor to submit a bond on first written demand. The following procedure will be adopted in the enforcement of such a bond.

a. If the Employer considers the Contractor is in default of due performance, then the Employer will give a written notice to the Contractor of such occurrence during which time the

Contractor shall rectify such performance to the satisfaction of the Engineer.

b. If in the opinion of the Engineer, such performance is not rectified, the Engineer shall inform the Employer accordingly.
c. The Employer will process his claim, basically in two options; en-cash the bond or asks the Contractor to extend the validity of the bond until works have been fully completed and any defects have been rectified.

On demand bonds are advantageous to the Employer in that they are payable on demand although they are a separate and wholly independent bargain. On demand bond is in effect a banking instrument rather than a bond. The Employer simply serves a written demand on the bondsman within the period of validity and does not need to prove default on the part of the Contractor or the Employer has incurred that damage.

The bondsman is not entitled to raise defences or cross claims that would have been available to the Contractor. However the Courts will not enforce on-demand bond where there is fraud on the part of the beneficiary in calling the bond. It is up to the bondsman to establish his own argument that the call on the bond is fraudulent. Subject to issues of fraud, the Employer only needs to comply with the formalities and procedures stated in the bond for the call on the bond to be valid. The bank's obligation to pay on the bond in the strictest sense is therefore a primary liability, independent of the Contractor's liability under the construction contract.

Representing a valuable security for the beneficiary, the bond should follow the format specified in the tender document. The format particularizes the statement to make unconditional payment without any reference to or contestation on behalf of the Contractor provided the claim is received on or before the expiry of a specified date. The guarantee will be effective and valid up to the date specified after which their liability shall automatically cease. The guarantee should be returned to the bondsman upon expiry or fulfilment of its undertaking whichever is the earliest. The Employer reserves the right to en-cash the tender bond if the performance bond is not submitted.

A performance bond is really aimed at insolvency of the Contractor, the Employer, whereas the parent company guarantee whilst may also provide protection on both insolvency and latent defects.

The effect and extent of security is a contractual dimension and a couple of restrictions on the use of bonds have been applicable for example the notification of the Contractor with sufficient time, if necessary, for the Contractor to be able to commence Court proceedings to restrain the presentation of the guarantee. This will, potentially, have the effect of removing the efficacy on the bank guarantee altogether and completely remove the advantage of the security. The obligation to obtain a judgment from a Court or an Arbitrator will too protract the whole process. A bank guarantee in essence should be a condition-free irrevocable direction to the bank requiring the bank to pay the funds to the Employer without reference to the Contractor.

However, the Courts have tended to decide such applications on the balance of convenience. In those circumstances, where the Contractor is prepared to provide an undertaking as to damages, and where the Employer will not in fact be substantially inconvenienced by the inability to have recourse to the security (for the present), the Contractor may obtain an injunction, at least for a short period, restraining the Employer from presenting the bank guarantee while the issues are tried out in the proceedings.

7.14 Summary

Risks are shifted to another party through indemnification agreements or indemnification clauses in construction contracts. Insurance policies are autonomous contracts between the insurance carrier and the insured. Insurance requirements for individual construction projects are generally set out in the insurance clauses in the contract itself and not all insurance policies are alike.

The rationale for providing security to the Employer is to put the Employer in the petition where, irrespective of any contractual entitlement, it can complete the works, or rectify defective works if necessary, using money retained by the Contractor. A bank guarantee as an alternative to cash retention is a form of security which was equivalent to cash for that cash retention. Typically, a Contract will expressly provide those circumstances in which the Employer may have recourse to the security including the conversion of bank guarantees to cash. For various reasons, however, the form of bank guarantee has tended to include, on occasion, certain restrictions on the Employer's ability to readily convert into cash.

CHAPTER 8
CERTIFICATES AND PAYMENTS

8.1 Introduction

No action arises on a contract without a consideration- *ex nudo pacto actio non oritur*. Construction projects run on the premise that payments shall be made promptly in consideration of the works executed. Payments shall be calculated on cumulative basis made at monthly intervals subject to various provisions in a contract. It is the net incremental value recommended as the amount due for payment. A primary obligation upon the Employer is to pay the Contractor promptly and fully the sum of money due under the contract in line with the progress unless there are specific reasons for withholding it. The starting point is the monthly statement submitted by the Contractor on a format approved by the Engineer. The Engineer may return any submission that is not made in the approved format.

Revenue for the Contractor is always a variable determined by progress on site and conditioned by retention and delays in payment. Typically, if the work is valued at the first week of the month, a delay of a few days can be expected till the interim certificate. There will be a further delay in the interim payment and finally the Employer will have a grace period under the terms of the contract until everything falls due. This will give nearly a few weeks lag from valuation to payment. There will be much cash outstanding until the settlement of the final account, also. Apart from the time lag sometimes, payment certificates may not be honoured as scheduled and serious undervaluation may also arise. Failure to meet interim certificates may constitute a breach of contract and could result in the Contractor abandoning the contract and suing the Employer. However, this is scarcely frequent.

It is a good practice at the outset that quantity surveyors of the Employer and Contractor arrive at a programme, which tentatively specifies cut off dates for submission, evaluation, negotiation, and payment of interim valuations. This enables the parties to finalise the payment pattern of preliminaries and other lump sums also in line with the physical progress and cash flow disbursement.

8.2 Mobilization advance payment

An advance payment is an interest-free loan released on fulfilling the requirements such as signing of the form of agreement, submission of an advance bond and submission of a performance bond. The Contractor is generally entitled to a sum of 10% of the contract sum excluding contingencies as a mobilisation advance on a guarantee valid for a period specified or till the full recovery, whichever is chosen. The deduction of this advance money will be made from each interim valuation, (or in some contracts, starting when the amount paid to the Contractor reaches a certain value or percentage of the accepted contract amount), usually at 10% of the work done in a way that the full recovery is made before the project is substantially completed.

Hence, the Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor as indicated in the payment certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been fully recovered by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid. This is implied in fact, if not expressly given in the contract.

In some cases, a release of advance payment is allowed in several instalments, actually one advance payment in each of the construction years recovered by the end of that year. Advance payment paid in each year represents a certain percentage (for example 30%) of the cash flow of each year. A recovery of the advance payment is made while retaining the whole amount certified, up until the whole advance payment is recovered, and then the Contractor starts receiving money due under the payment certificates.

In all cases an advance payment is to be made only after the Contractor submits a valid advance payment bond to the Employer. The advance payment guarantee amount can be reduced after the recovery of each portion of the advance payment. After recovery, the advance payment bond will be released to the Contractor on application to the Employer, which will not be unreasonably withheld. Retaining an invalid expired guarantee with the Employer however provides no guarantee. The Employer sometimes reserves the right to deduct the remaining balance in the advance payment in a Contractor's default whilst the bond is validly effective.

Some small contracts do not have a provision for an advance payment whereas larger contracts have several advance payments recoverable in accordance with the schedule of recovery agreed by the parties. Mobilisation advance is to ease out the Contractor's cash flow in order to marshal the initial preparatory works including material and plant deployment on site and bridge the cash in and cash out at times when the progress is critical in completion. Hence, the intention is constructive.

8.3 Payments for materials

Building materials, components and assemblies are a major part of costs incurred by the Contractor and held up in cash flow awaiting liquidity. All materials owned by the Contractor for incorporation in any works shall become the property of the Employer upon delivery to the site, and shall not be removed without an instruction or prior written consent of the Engineer. Materials shall only be revested in the Contractor to the extent that they may be found to be surplus to the actual requirements. The operation of this clause typically found in many contracts shall not be deemed to imply any approval by the Engineer of such materials or prevent the rejection by the Engineer of any material at any time.

Often materials on a selected list are paid in a sum of net invoice value, usually 80%, in order to ease out the cash flow before they are converted into measured works. A qualification is that these materials must have brought to the site for use into permanent works and kept safely in compliance with the specifications. Materials at site are essentially a major cost significant item where lot of money has been wedged in the Contractor's cash flow. There is no inherent principle applicable in paying for materials other than what is expressly provided for contract. For instance, the sub-clause 14.5 of the current FIDIC Red and Yellow books provide for the inclusion in an interim certificate of plant and materials which have been sent to the site, subject to certain additional requirements. And yet plant and materials do not appear to extend to small items such as consumables, or associated sundry materials.

Usually, the contracts will expressly provide whether the Contractor is entitled to include, in progress claims, an amount for goods which have been either ordered, or supplied, but for particular reasons not yet delivered to the site. Such items might include, for example, bulk steel where that steel has to be purchased and then shipped to a fabrication yard prior to delivery to the construction site. The Employer is potentially exposed to loss where goods are to be paid for which have not yet been delivered to the site (for example, if the goods are lost, stolen, or damaged while offsite and out of the Employer's control, or alternatively if the goods are not adequately identified and the Contractor, having received payment for the goods, then goes into liquidation, thereby exposing the Employer to a potential dispute over ownership of the goods). Under circumstances, the contracts expressly provide for, at the minimum, where payment is to be made for offsite goods, that adequate written evidence of the passing of title in the goods to the Employer. Off site materials such as prefabricated units can be measured and valued under materials at site provided their ownership has been taken over by the Employer in a vesting certificate or in any other legal instrument.

With paying only 80% of the net invoice value of materials brought to site, relative to the bill value, sometimes the Engineer imposes another 5% over and above the invoice value. This is not only over-protective of the Employer's interest, but also wrong in strict contractual sense. Clearly, the retention is applied to the value of the works completed to date, and then the net value of materials on site is added to the amount due.

As long as the Employer has a clear title to the materials on site, the agreed value must be relative to the bill rate rather than the price given on the delivery notes and that the quantities are equal or less than the quantities to be incorporated in the permanent works, with no allowance for loss or wastage.

A question arises in a situation where the value of materials on site is more than the total bill amount, when a couple of item in the bill are completed, once this particular material is consumed. Materials on site is certified pursuant to payment terms which state the percentage of invoice value of the material on site has to be certified. Whilst it determines the amount of the payment to be included within interim payment certificates, the contract provides that the Engineer is to certify the amount which he considers due and payable.

In the issue of the value of the materials on site as claimed by the Contractor exceeding the value included in the bill of quantities, it is prudent to assume that the Contractor has delivered materials in excess of the quantity reasonably required for the work. The Engineer has the option of certifying against the bill quantity as he considers reasonable. Alternatively when the invoice is overstating the value, the Engineer may certify what he considers reasonable.

8.4 Non payment

Conditions of contract sometimes provide the Contractor a right to suspend work if there is non-payment despite of whether the Contractor by virtue of law cannot approbate or reprobate a contract. If a sum is due under a contract and there is no effective notice to withhold payment then the Contractor has the right to suspend performance of its obligations. A 7 days' notice is usually given of the intention to suspend and the right to suspend ceases when the full payment is made. The suspension period and delay caused thereby, directly or indirectly, shall be disregarded in computing any contractual time limit including the time to complete. Therefore, the time when the works are suspended will effectively be the subject of an extension of time. Equally if there is a knock-on delay (the suspension causing a Contractor to lose its 'slot' in sub-Contractor's workshop for example), that too will be the subject of an extension of time.

For instance, sub-Clause 16.1 of the FIDIC Conditions of Contract for Plant Design-Build provides a right to suspend or terminate in non-payment. In substance, it provides that where (a) the Engineer fails to issue an interim payment certificate to the Employer within 28 days after receipt of the Contractor's (valid) statement of costs, or (b) the Employer fails to honour a (valid) interim payment certificate within 56 days of its issue, the Contractor may reduce the rate of progress or suspend the works. However, the Contractor must give to the Employer at least 21 days' notice (in due manner and form) before exercising this right. If the Contractor is subsequently paid then he is entitled to an extension of time and to payment of any reasonable costs plus a reasonable profit for the period of suspension. But he must resume work again as soon as is reasonably practicable.

If however the Contractor does not receive the amount due under an interim payment certificate issued by the Engineer within 98 days of the issue of the interim payment certificate (comprising the 56 day payment period under Sub-Clause 14.7 and a further 42 days' grace provided in Sub-Clause 16.2(c)) then, by force of Sub-Clause 16.2(c), the Contractor may terminate the Contract. To do this, the Contractor must have issued a notice to the Employer no later than 14 days prior to the termination.

However, at common law, one contracting party (A) has no right to suspend performance of contractual obligations on a temporary basis, on the ground that the other party (B) was in breach of contract. Unless the breach was sufficiently serious to justify A in terminating the contract altogether, A's only remedy was to claim damages, in the meantime continuing with the contract. Unless the Contract specifically provided for suspension of work as a remedy for non-payment (as in FIDIC 4th edition and the JCT forms of subcontract), a Contractor who suspended work on the ground of not having been paid would be guilty of a breach of contract in failing to maintain regular and diligent progress under another provision in the same contract.

However, this legal position has been reversed by statute in recent days in some countries. Section 112 of the Housing Grants, Construction and Regeneration Act 1996 in UK provides that where any sum due under a construction contract has not been paid in full by the final date for payment (Section 14.1.2), and no effective notice to withhold payment has been given (Section 21.4.4), the payee has the right to suspend work until full payment is made. This right may not be exercised without giving the other party at least 7 days' notice of the intention to suspend, stating the grounds on which this action is based.

One of the strategic options in a payment delay might be to slow down the execution of work. The Employer may in response to the inevitable slowing of progress, seek pre-emptive remedies, such as encashing the performance security; and if the project runs late, then the Employer may claim damages for breach of contract. The Employer may even justify in terminating the contract for breach of obligation to proceed regularly and diligently. A termination will usually be followed by a repossession of the site, a taking over of control of the plant and machinery on site, and a claim for damages for the cost of completing the works by an alternative Contractor.

The right of the Contractor to walk off the job for non-payment is related to the common law principle of 'failure of consideration'. Under this doctrine, a party may be discharged from rendering further performance when the breach by the other contracting party is so material to constitute a failure of consideration. Whether a particular failure is sufficiently material may depend on what is stipulated in the contract. Non-payment may amount to a material breach, depending on the circumstances involved. Not all failures to make payment will be considered a material breach. It depends on the payment terms, the sums involved, the persistence of the Employer in failing to make due payments, any other wrongful actions, such as improper deductions for liquidated damages from payments due and any improper encashment of a performance security. A mere breach of a payment obligation does not justify termination at common law. What has to be considered is whether the circumstances of the non-payment show an intention by the Employer to go against the contract.

It has been remarked by the English Court of Appeal (in 1902) that a man who contracts to do a long costly piece of work is entitled to suspend work if he is not paid reasonable sums in part as work proceeds, unless he has agreed to do all the work, standing out of pocket, until he is paid at the end.

A Contractor on the other hand might argue that the Employer's failure to pay due sums on time has deprived him of necessary working capital. The potential for this argument is confirmed by a decision of the Technology and Construction Court in UK, on the doctrine of prevention where it is said that he who prevents a thing being done shall not avail himself of the non-performance which he has himself occasioned. Notwithstanding such pedigree, in practice, it is often challenged by difficulty in proving an actual inability to proceed with the diminishing working capital and the causal link between the Contractor's inability to proceed and the Employer's delay in payment.

Sometimes, the Contractor's obligation to execute the works continuously and diligently can be conditioned on making timely payments on an interim basis; such that in circumstances of a default in making interim payment, the Contractor's conditional obligation to proceed never arise. This is the doctrine of dependent covenants where the performance of one party depends on the performance of the other on the conditions which must be performed before the other party is liable to an action.

The validity of this argument in principle depends on the questions such as (i) whether the execution of the work does "in sense and reason" depend upon the making of due interim payments, or (ii) whether the making of due interim payments "goes to the whole of the consideration" (i.e. represents the main commercial return) for due execution of the works by the Contractor. As such, the focus will invariably fall onto the relationship between the Employer's obligation to make due interim payments and the Contractor's obligation to proceed with the execution of the works.

Courts have recognized the right of a Contractor to discontinue performance upon continuous delay in payment. Calling for the work covering a long period of time involving large expenditures can also be deemed so material that a substantial failure to pay would justify the Contractor in declining to proceed. Payment on account basis at irregular intervals is also contradictory with the primary objective of any payment clause. Payment in arrears does not mean to encourage payments at irregular intervals only when the funds are available.

In *CKP, Inc. v. GRS Constr.*[29] CKP entered into a subcontract with GRS, the prime Contractor, to perform site work and utility installation for the construction of an apartment complex. GRS threatened to withhold payment on grounds that the sub Contractor refused to agree to a contract modification. The sub Contractor never agreed to the proposed modification, walked off the job, filed a claim of lien, and brought a foreclosure suit. On the issue of whether the threatened withholding of payment amounted to repudiation of contact justifying the sub Contractor's walkout, the Court stated that repudiation of a contract by one party may be treated by the other as a breach which will excuse the other's performance.

However, walking off the job should be the remedy of last resort, because whether or not the non payment amounts to a material breach is a matter of fact to be determined by the Court, taking into consideration the particular circumstances.

8.5 Interests for delayed payment

Contracts are usually accompanied with an 'overdue payment' clause to grant a remedy in a payment delay. The Contractor is entitled to claim interest at a specified percentage per annum from the date due except for those parts of the certificate to which the Employer objects under reasonable grounds. The onus to show that the Employer's objections are unreasonable falls on the Contractor, however, on the reasons set out in response.

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[29] CKP, Inc. v. GRS Const. Co., 63 Wash.App. 601, 621, 821 P.2d 63 (1991)

Payment upon each interim certificate shall be made by the Employer within the time stated in the contract that usually allowed for lengthy payment procedure. This time frame largely depends on the type of organization. The period would be calculated normally from the date of certificate, despite of the date the Employer received it. In the event the Employer fails in timely making payment within the specified period however, the Contractor becomes entitled to claim interest on overdue payment at a specified percentage per annum from the date on which the same should have been made. The percentage would be the lending commercial rate prevailing at the time in question. However it is not clear in some cases whether the interest on overdue payment shall be made on simple or compound interest. Many argue that only simple interest is applicable.

Delayed payment may not sometimes result in a right to claim interest in circumstances where no right to payment arose because there was no entitlement come into existence until the Judge or Arbitrator decides that a right to an increased certification or payment existed.

Contractors may however keep claiming interests for overdue payments in each and every interim application till the issue is taken up by the Engineer at the initial level of dispute settlement. This head of claim forms part of the interim application under other sums prior to arrive at the net amount due in application. For instance, the right to interest in the form of FIDIC 1987 is as of right; that is the Employer must pay interest if he is late in discharging his obligation to pay the Contractor. The standard form does not require the Contractor to make any claim in this respect.

Unless the Contract expressly requires that the Contractor submits cash flow statements and payment, including any interest entitlement, shall be the basis on which the Employer makes payment, then the Contractor is entitled to payment of the interest accrued on any late payment. However, contracts governed by civil codified laws stipulate that every agreement stipulating payment of interests in consideration of investment of a sum of money, or of the delay of performing the obligations undertaken of the same shall be null and void.

8.6 Interim payments

All measurements submitted in part of the monthly application for payment, regardless of detail, remain estimated values for interim payment purpose only. The Engineer shall issue an interim certificate similar to or more than the minimum net interim amount as stated in the appendix to form of tender. The Engineer shall issue the interim certificate to the Employer with a copy to the Contractor, generally within 28 days of the statement submitted by the Contractor certifying the amount due under the certificate. This includes the total value of work done including varied work, an 80% of invoice value of materials delivered to site and not yet incorporated in permanent works, plus any other claim approved subject to deduction of retention, partial recovery of advance, any sum due to the Employer and of course the previous payments.

The Employer shall make payment within the period specified in the contract after the Engineer delivers his certification to the Employer. Therefore, the interim payment certificates are documents stating the amounts which shall be paid to the Contractor in a period of time stated in the contract, named, sometimes, 'the period of honouring certificates'. The Employer may accept, object or reject to pay in total or in part of the payment so recommended. There are circumstances where the Employer may reject making payment such as by way of bona-fide defence or counter claims, lack of necessary additional supporting documents, right to deduct monies expressly given in the contract, etc.

In a recent case, the Contractor sued an Employer for final payment which the Employer withheld as liquidated damages. The Contractor alleged that its delay in completion was excused because it had been impacted by the Employer's separate prime Contractor, unusual weather and design changes. During the progress of the work, the Contractor requested only one time extension, which was granted. Importantly, the Contractor failed to request time extension for impacts caused by the Employer's separate prime Contractor, unusual weather and design changes. The Court held that these impacts were not excused because they were waived by the Contractor's failure to request a time extension as provided in the contract. As a result, the Employer was justified in withholding the final payment to pay liquidated damages.

8.7 Adjustment of contract sum

Conditions of contract designate a couple of circumstances to adjust the contract sum. Variations, price escalations etc allow the parties to adjust the contract sum. In some projects, the value of work to be completed under the contract is deducted from the total contract sum rather than adding the value of completed works on a pure valuation basis.

Where financiers are involved in funding, this method of valuation has tended to be adopted from time to time, the financiers being concerned to ensure, for the purposes of their security, that there are at all times sufficient funds left for the balance work. Accordingly, in certain cases, the Engineer in assessing the progress is allowed to adjust the contract sum by calculating the value of work to be completed, as opposed to the percentage of work completed on a pro-rata basis.

Assuming in a B/Q item for filling cavities with grout in a road interchange project which was not required since no cavities were found in the ground so that the Employer is insisting on deducting the item since it has not been carried out. The Contractor in turn argues that grouting is a risk item the Contractor has taken on unforeseen situation (no technical investigation reports made available) when pricing the contract and so he needs to be paid whether it has been carried out or not. Also there are items that do not arise at all in the project (zero work) due to erroneous B/Q forwarded to the Contractor to incorporate his lump sum price. The Employer wants to deduct those items too since no work done.

It must be noted that although the contract is a lump sum, it is highly likely that it is not intended that the lump sum will be the final price paid to the Contractor. In this respect parties must consider the definition of the contract price or contract sum, the payment provisions and whether or not the contract provides for variations (or change orders) which might allow for omissions from, or additions to the original scope, etc, etc. By fact that there is a bill of quantities, there should be a statement as to how the B/Q will be used both in the determination of lump sum price and in the evaluation of any permitted variations. The instructions to tenderers may also be important, as might in defining where the risk was intended to lie.

If the lump sum can be adjusted for variations and the intended reduction is significant then consideration should also be given to whether the Contractor has a right to make a claim. A claim might be on the basis that the change has affected the economics of the original bid and that the Contractor is entitled to payment of the overheads and profit element included within the bid for the work now being omitted.

As the nature of the work was such that it would be required as and when found, if at all, was this not deemed as a provisional item for inclusion in the tender bids. This will give a good indication of whether the risk was to stay with the Employer or with the Contractor.

If it was not defined as being 'provisional' some thought should be given how the Contractor would have allowed for the work within his planned methodology, resourcing and timing and whether the fact that the work was deemed unnecessary at an early stage, so that the Contractor had time to reconsider his methods and mitigate the overall 'loss'. The Contractor of course has to reveal his pricing strategy in arriving at the lump sum quoted.

In a lump-sum contract, the Employer may desire to cancel particular items which have a specified price in the bill of quantities. Providing the Employer is not doing that for executing the omitted works by him, or hire another Contractor, he can do that. As long as there is a price for those items, they can be simply deducted from the contract sum but in the meantime the Contractor may claim for such prices for not being deducted entirely, as his overheads must have been spread in all items. The Contractor may also claim for the loss of profit.

Often a question is whether the final sum includes prime costs, provisional sums and contingencies in a lump sum contract. Prime costs sums are normally used for work by nominated sub-Contractors, which have not been defined at the time of award. Alternatively they might be used for large single items such as lifts, which will be decided by the tenant when one is found. Thus the prime cost is the cost plus whatever percentage for overheads including attendance as stated in the Contract. Secondly, provisional sums are those which will be paid following instructions from the Engineer and generally involve unknown items such as locating underground services, where neither number, duration nor the costs can be defined at the award. Thus the cost is again the cost plus whatever percentage for overheads including attendance as stated in the Contract. Thirdly, the contingencies are the Employer's allocation within the contract sum reserved for any unexpected expenditure in the overall project delivery. The percentage for contingencies would already be decided by the format of the bill itself.

The above cost elements are all outside the lump sum payment, because they have been identified separately. If the method of calculating the final contract sum has not been specified in the Contract then it is better to be even-handed rather than mean, because the lapse in drafting the contract.

8.8 Partial payments

A question arises whether a party who performs his obligations partially is entitled to any payment or performance from the other party.

In the case of *Cutter vs Powell*[30], Cutter agreed with the defendant to work as second mate in a vessel sailing from Jamaica to Liverpool for a payment of thirty guineas. Cutter died nineteen days before the ship reached Liverpool. An action was brought by Cutter's widow to recover a portion of the payment agreed upon between Cutter and the defendant. It was held that Cutter's widow was not entitled to a portion of the payment because the contract was to pay a lump sum to Cutter upon the completion of the entire duty.

In *Sumpter vs Hedges*[31], the plaintiff who had contracted with the defendant to erect a couple of buildings abandoned the contract and the defendant himself completed the buildings. It was held that the plaintiff could not recover the value of work done. This principle was also applied in the case of *Bolton vs Mahadeva*[32] where the plaintiff installed a central heating system in the defendant's house for 800 pounds. The system was defective and the defendant refused to pay for it. The plaintiff could not recover anything.

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[30] Cutter v Powell (1795) 101 ER 573

[31] Sumpter v Hedges [1898] 1 QB 673

However, some Courts have held that where a contract is divisible, performance of a divisible part entitles a party to payment for such performance. For example, in an employment contract it is usual for one party to provide payment at weekly or monthly intervals. Therefore, if an employee breaches the employment contract he would still be entitled to payment for the work that he has already done because he would be paid weekly or monthly. This rule of division is quite sensible as it applies in both ways.

According to the doctrine of substantial performance a person who has substantially though not fully performed a contract is entitled to payment, of course liable to pay damages for his partial non performance. This rule would apply only if the partial non performance does not go to the root of the contract. The justification for this rule is seen when the Employer would be entitled to take the benefit of work done.

The principle of prevention also applies when one party to the contract is prevented from performing all his obligations under the contract by the other party, so that the former can recover for the work done on a quantum meruit basis. However, where there is a breach of warranty by one party to a contract, the other cannot avoid payment or avoid performing his obligations under the contract. The latter can only claim damages for breach of warranty.

8.9 Payment for variations

Variations are a head of payment in both interim and final payment certificates. A common contract regime for valuing variations is, generally, the Engineer and the Contractor agree on the value of the approved variation; failing such agreement, the Engineer assesses the value of variation in accordance with any pre-agreed rates which may be applicable for such variations. Where there is no such applicable rates, the Engineer determines a 'fair rate', giving due regard to all the circumstances. This regime cannot be avoided since it has been contracted in writing. As long as the bottom line is clearly established in principle, i.e., the mechanism of fair valuation, and the basis of valuation (compared to the nature and amount of any variation relative to the nature and amount of whole of the works), it is important not to disturb the primary intent of the provision by further explaining different scenarios and advising the parties how to act upon. The answer depends on a gamut of factors, be them technical, economic, physical and so on. Accordingly, each case is unique and to be evaluated on its own merit, where the QS expertise triumphs.

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[32] Bolton v Mahadeva [1972] 2 All ER 1322

8.10 Retention scheme

'Retention' clause illustrates the operation of the retention scheme. A portion of payment due to the Contractor is withheld from each interim valuation for the Employer to underpin contractual performance in particular inducing the Contractor to rectify any defects appearing during defects liability period. Usually, the retention is calculated at 10% of each bill certified until the sum so retained reaches 5% of the contract sum. Upon the issue of certificate of completion, a one half of retention is released and at the expiry of maintenance period, the second half is released. The Employer reserves the right to withhold release of retention until any outstanding work is completed.

Notwithstanding the foregoing, there is no reason with the spirit of the contract whereby the Employer may not release the amounts retained or make other payments earlier or in excess of his contractual obligations, if he so wishes. Retention can be released in order to ease out the Contractor's cash flow constraints in case the Employer has no objection for release on a guarantee bond.

The attraction of providing a bank guarantee, for the Contract, is that (providing the Contractor has security at its bank for the relevant amount) the cost of the bank guarantee to the Contractor (typically of the order of 0-2% of the sum involved) is negligible in comparison with having the access to the relevant amount of cash. The amount usually provided by way of a bank guarantee should mirror the amount which would otherwise be provided by way of cash retention. For example, it is a typical amount to be provided by way of bank guarantee for amount equal to 2.5% of the contract sum provided at commencement of the works, a second bank guarantee for 2.5% of the contract sum provided half way through the completion of the works, the first bank guarantee being returned at practical completion, the second at the end of the defects liability period.

The purpose of the Contractor providing this security is to put the Employer in the position, at all times, of being able to step in and complete all or part of the works, as necessary, where the Contractor fails to do so under the Contract. For example, where a contract requires that 10% of the value of work done is withheld against each (interim) payment certificate this can be omitted where a retention bond is provided in substitution. The Employer has the security offered by the bond from the commencement of the project and the Contractor's cash flow is improved during the course of the project.

Retention bonds, procured for the purposes described above, should reasonably contain provision for the bond to be reduced in value by 50% upon the issuing of the Taking-over certificate. The bond would then be released entirely at the end of the defects liability period. Another aspect related to retention is the Contractor's ability to secure interests for money accumulated since the beginning of the project. Many standard forms of contract had this provision enabling the Contractor to claim interests on the principle that retention belongs to the Contractor who would have otherwise earned interests on it.

8.11 Contractor's security

One could envisage circumstances in which the Employer might provide security (where, for example, the company with which the Contractor was contracting was not the registered Employer of the land). Alternatively, there may be some issues about the financial security of the Employer. For instance, the clause 2.4 in FIDIC Red book insists that the Employer shall submit, within 28 days after receiving any request from the Contractor, a reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price (as estimated at that time) in accordance with Clause 14 (contract price and payment). If the Employer intends to make any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars. Alternatively, the Employer might be a foreign corporation and there may be concerns as to the ability of the Contractor to obtain payment where enforcement proceedings ultimately become necessary.

The convention is that the Employer does not usually provide security to the Contractor. However when Contractors enter into contracts with Employers they must be aware that unless the retention monies have been set aside in a formal legal trust or in a separate bank account the money is not protected if the Employer goes into liquidation. It is therefore essential that the contract has provisions within it which ring fence the monies; so that they will remain separate from the Employer should the Employer go into liquidation.

8.12 Correction and withholding of certificates

Another important clause is "Correction and Withholding of Certificates" that confers the absolute power to the Engineer to correct any error in a previous certificate (to devalue, increase or to omit work done already certified) and to withhold any interim certificate if any part of the work was found to be unsatisfactory in accordance with the contract. The quantity surveyor in this regard may perhaps detect any error in previous valuations and revise the certificates to the Engineer's approval. The intention of this clause is to give the Engineer a contractual reservation to avoid continuity of any incorrect payment arising out of under/over measurement and pricing and to induce the Contractor to revisit the work of inferior quality and poor workmanship.

In an overpayment due to mistake in the previous certificate, the Employer may forfeit an unconditional performance security if the Contractor refuses to reimburse a double payment effected for the same certificate. Particularly, when the value of works is insufficient to recover the double payment, there is a provision in FIDIC 87-92, to en-cash a performance security under clause 10.3, claims under security and the clause 63.1 Contractor's default. The Engineer shall notify the Contractor any such claims the Employer is eligible for.

8.13 Disposal of provisional sums

Provisional sums are basically the Employer allocations to be expended either wholly or partly at the behest of the Employer. Every provisional sum set out in the B/Q (whether for work to be executed by the Contractor which has not been specified in detail because the scope of work is so scanty for measurement and payment, or for work to be executed by a nominated sub-Contractor by a local government service provider) shall be deducted from the contract price if nothing has been executed. This deduction shall include any charges and profits (if any) the Contractor may have added to such sums.

Where work to which the provisional sum relates has been ordered by the Engineer and executed by the Contractor, the value of the work so executed shall be ascertained in accordance with the variation clause where quantities are subject to re-measurement. Where work to which the provisional sum relates has been ordered by the Engineer and executed by a nominated sub-Contractor, the sums actually paid by the Contractor to sub-Contractor on the direction of the Engineer and (If the Contractor shall have added to the provisional sum to which the work relates any sums in respect of charges and profits) a sum in the same proportion to the sum so actually paid as the said charges and profits bear to the said provisional sum. There will be an attendance fee.

The same principle has been adopted in the administration of prime cost items. Every sum in the bill of quantities which contains (either as the whole or part or the sum) a prime cost price for goods or materials to be supplied for or for incorporation into the works shall be varied by the substitution of the actual price paid by the Contractor for the goods or materials. No variation shall be made to or in respect of any sum added for labour to the prime cost price on account of the said actual price being greater or less than the prime cost price. But in respect of all other charges and profit, there shall be added or deducted as the case may be a sum representing such percentage as is provided in the bill of quantities in relation to the particular item of prime cost concerned.

The Engineer' direction is a must for disposal. All sums set out in the B/Q as provisional or prime cost sums shall be used only at the direction of the Engineer and if not used either wholly or in part shall as to the amount not used be deducted from the contract price. The Contractor shall when required by the Engineer produce all quotations, invoices, vouchers, accounts and receipts in connection with expenditure in respect of provisional or prime cost items. Usually, any cash discounts allowed by nominated sub-Contractors shall be for the benefit of the Employer, unless the parties have agreed otherwise.

For all work executed or goods, materials, plant or services supplied by any nominated sub Contractor, the Contractor shall be entitled to the actual price paid or due to be paid by the Contractor, on the instructions of the Engineer, and in accordance with the sub contract. Also, in respect of all other charges and profit, a sum being a percentage of the actual price paid or due to be paid calculated, where provision has been made in the bill of quantities for a percentage to be set against the relevant provisional sum. Where no such provision has been made, at the percentage inserted by the Contractor in the appendix to tender, and in respect of prime cost rate items, the value will be calculated using adjusted rates as prescribed by the contract.

8.14 Payments to nominated sub Contractors

Before issuing any certificate, which includes any payment in respect of work done or goods, materials, plant or services supplied by any nominated sub Contractor, the Engineer can demand from the Contractor a reasonable proof that all payments, less retention, included in previous certificates in respect of the work or goods, materials, plant or services of such nominated sub Contractor have been paid or discharged by the Contractor.

The Employer shall be entitled to pay to such nominated sub Contractor direct, upon the certificate of the Engineer, all payments, less retention as provided for in the nominated sub contract, which the Contractor has failed to make to such nominated sub Contractor and to deduct by way of set off the amount so paid by the Employer from any sums due or to become due from the Employer to the Contractor.

Provided that, where the Engineer has certified and the Employer has paid direct as aforesaid, the Engineer shall, in issuing any further certificate in favour of the Contractor, deduct from the amount thereof the amount so paid, direct as aforesaid, but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

In discharge, the Engineer is required to seek a minimum of three competitive quotations for items, which are the subject of provisional sums. There is always a sub clause specifying the manner as to how provisional sums be used in the contract. It specifies the powers vested with the Engineer in disposal of provisional sums so that the Engineer is able to give orders in connection with the works covered under provisional sums.

However, payments to nominated sub Contractors are sometimes crucial when the contract is not clear in administering the payment procedure other than the obligations. The contract price shall include the goods supplied, works carried out or services rendered by the nominated sub Contractor including the sum being a percentage provided competitively in the bill of quantities or notionally in the appendix to form of tender for attendance. The fee for attendance is to reimburse the cost on supervision, providing facilities, scaffolding etc, coordination, communication and associated costs either incurred or not incurred by the sub Contractor.

On the other hand, the clause "Certification of Payments to Nominated Sub Contractors" usually empowers the Engineer to claim from the Contractor a reasonable proof that the payments have been made to the nominated sub Contractor on time. Accordingly, the Contractor is obliged to inform the Engineer in writing any reasonable cause for withholding or refusing to make payments to the nominated sub Contractor. Also, the Employer reserves the right to make a direct payment to the nominated sub Contractor in a delay or non-payment on any unreasonable grounds. The nominated sub Contractor is therefore safeguarded against delays and non-payment by the main Contractor of his legitimate dues.

In the event of any nominated sub Contractor having discharged his duties in respect of the completion and maintenance of his works, there is no bar to the Employer issuing a partial maintenance certificate pertaining to those works only, and further issuing a payment certificate to the Contractor on behalf of the nominated sub Contractor, whereby the monies still retained against the contract would be adjusted to allow for the value of retention withheld from the nominated sub Contractor to be released to him. However, prior to certifying final release of retention for the nominated sub Contractor, it would be advisable to obtain proof from the Contractor as to the actual amounts withheld by the Contractor and to further obtain the corroboration of the nominated sub Contractor.

In evaluating the appropriateness of further release of retention, the Employer may wish to weigh the actual and anticipated final values and status of his approvals of individual Contractor's and nominated sub Contractor's accounts against actual amounts already paid.

8.15 Cash flow

Cash flow reflects the pattern of cash in and cash out as the work proceeds. It is typically in line with the progress S-curve where the Contractor has to find a means to fund the difference when cash-in is lesser than cash-out. This is the period of cash crunch identified in cash flow forecasting against the construction program and the payment terms. One of considerations is the ceiling limits for both minimum and maximum payment at monthly and annually for honouring certificates. The annual cash flow is set either by the Employer or the Contractor, as stated in the contract, usually given in the appendix to form of tender. The Contractor's actual payment will be made only when the minimum interim value has been achieved at the respective billing month. This payment shall also be subject to the maximum limit of payment annually depending on what is agreed in the contract. Any balance value of works carried forward from previous years due to excess of above limit will not attract claim on interest, instead there can be a bonus scheme for early completion.

8.16 Payment in termination

Payment and termination do not go together but in termination for convenience, the Contractor shall be paid for the amounts legible under the contract. In the meantime, the Engineer is authorised to determine ex-party the amount entitled and due payable to the Contractor or Employer after contractual expulsion. This does not however restrict the possibility of having negotiations with the defaulting party. Any excess paid to the Contractor is deemed to be a debt due by the Contractor to the Employer. In the event the Employer expels the Contractor under the termination clause, he is not liable to pay any amount due to the Contractor after valuation till the expiry of the maintenance period. More over, it is a question of fact to be determined by the Engineer.

8.17 Payment in frustration

A contract is automatically discharged whenever the law recognizes without default of either party a contractual obligation has become incapable of being performed because the circumstances in which the performance is called for would render radically different from that envisaged. A contract may be frustrated (subject to exceptional circumstances as would be stated in local laws) if a thing essential to its performance is destroyed or becomes unavailable, a fundamental change of circumstance occurs, a party to a contract of a personal nature dies or is otherwise incapacitated, performance of it is rendered illegal or a basic assumption on which the parties contracted is prejudiced.

The clause for 'Payment in the Event of Frustration' relieves either of the parties from performance if circumstances arise outside the control of both parties. The call for such release of performance would come from the Employer as it is tied up with the payments in a termination. The Contractor may therefore invoke this clause where it may be agreed without any ambiguity that the Contractor will be released from performance.

As stated, the Employer may elect to accept certain expected risks, and so avoid receiving artificially high tenders which could contain each tendering the Contractor's own individual assessment of the probability of any of these expected risks occurring. The Employer undertakes to indemnify the Contractor against claims proceedings, damages, costs, charges and expenses whatsoever, which arise in the event of certain special risks occurring. The Employer has a right to terminate the contract by written notice if any outbreak of war occurs.

However, the Contractor shall be paid for the amounts not fully covered by payments made on account basis, all works executed prior to the date of termination, preliminaries in a proper proportion which has been partially carried out and the cost of materials reasonably ordered for works and delivered to the Contractor or legally liable to accept delivery. The payment shall also include any expense reasonably incurred in the expectation of completing the works and for which the Employer shall have derived benefit which is not covered in previous payments and any additional sum payable under other clauses if any. The Employer reserves the right to reconcile the accounts by crediting with any outstanding balance due from the Contractor.

8.18 Pay in advance

There are situations where the Engineer postpones some work due to very technical reasons such as in date palm replanting where the climate is found to be not conducive though such item is critical for 'contractual' completion. The Engineer has the choice, of course on mutual grounds, to instruct the Contractor to submit in his penultimate claim the amount for this particular item to be executed when the time comes, perhaps during the maintenance period. Although payments are to be made in arrears, the Contractor can be allowed to pay for it on an unconditional on demand en-cashable bond so that the liquidity is fully secured for the Employer to recover in case the Contractor walks away the site.

8.19 Pay when paid

A pay when paid clause sets a condition precedent to payment. It is a way by which a Contractor shifts to a sub-Contractor the risk of non-payment or delay in payment by the Employer. Many jurisdictions have rendered 'pay when paid clauses' ineffective unless the Employer becomes insolvent. The same is true for sub Contractors and so on down the chain and the very reason must be to spread the risk associated with insolvency as widely as possible. However, it applies where there is a pay when paid clause in the contract and the parties have agreed no other conditions. If the intent to shift the risk of non payment is not clearly expressed, the payment provision must be interpreted as establishing a reasonable pay back period rather than condition precedence. However, many argue that a 'pay when paid' clause is merely setting forth the timing for payment, not a condition precedent for payment. As such, if the Employer fails to pay the general Contractor, the general Contractor will still have an obligation to pay its sub Contractors.

8.20 Pay when done

Pay when done clause is usually found in subcontracts. The general Contractor agrees to pay the sub Contractor upon completion of the work, regardless of whether the Employer pays the general Contractor for the work performed. This payment structure provides the least protection for the general Contractor and is most advantageous to the sub Contractors.

Courts have held that 'where a defendant prevents the performance of a condition of a contract, the condition is excused.' If the Employer has refused to pay the general Contractor because of the general Contractor's own breaches, the general Contractor has, in essence, prevented the occurrence of the condition precedence and cannot assert the Employer's non-payment as a defence.

8.21 Pay if paid

A 'pay if paid' provision provides that the general Contractor is only obligated to pay the sub Contractor if it is paid by the Employer. If the Employer never pays the general Contractor, then the general Contractor is not required to pay the sub Contractors. This type of clause affords the greatest protection to the general Contractor. To be enforceable, the assignment of the risk of non-payment must be clear and unambiguous; any doubt will be construed against the general Contractor.

As a condition to any payment by the main Contractor to sub Contractor, the main Contractor must first receive payment from the Employer for the work of sub Contractor for which payment is sought, where the sub Contractor specifically agrees that it is relying upon the Employer's credit (not the Contractor's) for payment, and accepts the risk of non-payment by the Employer. At the reasonable request of the sub Contractor, the main Contractor agrees to furnish such information as is reasonably available from the Employer regarding the financial ability to pay for performance under the main Contract. The parties agree that the Contractor does not warrant the accuracy or completeness of information provided by the Employer.

Conditional payment clauses are not favoured by Courts on public policy grounds. Courts have reached its position by noting first that a sub Contractor's lien right depended upon its contract rights. A pay if paid clause could indefinitely suspend a sub Contractor's contractual right to payment and that a 'pay if paid' clause amounts to a forfeiture of the sub Contractor's lien right. Accordingly, a payment by Employer to a Contractor can not be a condition precedent for payment to a sub Contractor.

8.22 Milestone payments

Generally, the payment provisions require progress claims to be submitted by the Contractor on a regular basis and for those claims to be valued by the Engineer who determines the value of works completed within the period and the amount the Employer is required to pay to the Contractor. An alternative to this claim/valuation/payment process is where the contract provides for payment to be made upon certain events being achieved. These payment provisions are known as stage or milestone payments and require the Employer to honour them upon the Contractor achieving the stage or milestone specified in the contract.

For example in roads, this payment mechanism is ideal because particular stages of completed work are easy to identify at set chainages. But in most construction contracts with work being done by many different trades simultaneously and reaching different stages of completion at different times, then milestones are not appropriate. Milestone payments may, however, be suitable in contracts where the series of milestone completion can be accomplished on site where no further assessment of the value required in the same milestone.

In the stage or milestone process of determining entitlements, payment is made upon a stage or milestone being achieved and, if the contract has been drafted accurately, the value of the payment will represent a fair and reasonable value for the work undertaken for each stage of the works completed.

The competing interests where the Contractor seeks payment as soon as possible as opposed to the Employer withholding payment to ensure that all works have been completed must be clearly contemplated in the stage or milestone payment terms. In circumstances where the contract does not provide a clear interpretation as to what works are to be completed to achieve payment, disputes may arise. Until recently, the only interpretation available on this issue was found in Hudson's Building & Engineering Contracts 11th Edition at paragraph 4-024 which states:

> *"... In the case of stage payments ... there will be no room for any theory of substantial performance, it is submitted, save in regard to purely trivial failures, although sometimes it may not be an easy question of fact, when dealing with stipulated stages of construction of an uncompleted project, to determine when sufficient completion of a stage of the work on which an instalment depends has been achieved".*

Satisfactory completion of the required stage will be a condition of any instalment payment, and there could be no question of substantial performance credit for in this payment mechanism. For instance, payment of a particular stage can contractually be valid only when the

Contractor had achieved practical completion of the items of work set out in that stage. Completion of outstanding work during the next stage is a matter to postpone milestone payment for the preceding stage.

8.23 Payment structures

In a lump sum contract, the Contractor assumes the risk of performing the work within the lump sum price provided; therefore, clear and accurate bid documents are necessary for the Contractor to assume that risk. If the bid documents are insufficient to provide an accurate bid, the Contractors will include a contingency to cover potential costs above what the Contractor has included in the bid, making the overall project cost higher.

If the bid documents are less developed, either a cost-plus or unit rate arrangement would be appropriate. Each of these contract payment arrangements shifts part of the risk of increased project costs to the Employer. The Contractor will either be paid for its costs and profit or paid at unit rates. In this arrangement, it becomes more important for the Employer to review and inspect the Contractor's work, not only to make sure it meets the specification requirements, but also to ensure that the work is being done in a cost efficient manner.

G-Max is a payment structure where the Contractor performs the work on a time and materials basis and is compensated for all labour, equipment, and material costs, including mark-up. In addition, the contract includes a maximum value for the Contractor to perform the work. Most G-Max arrangements provide incentives to perform works for less than the guaranteed maximum price (e.g., bonuses for performing the work under budget or finishing the work early, or receiving a percentage of the savings, etc).

8.24 Payments at suspension

A common issue in many road rehabilitation projects is that the Contractor has been prevented from site access due to delay in resettlement of occupants either side of the road. As a result, the Engineer may resort to a suspension order for the scope of work so affected. Sometimes labelled as ‘obstructed’ work, the scope of work so delayed is usually taken up at a later stage with a new completion date.

However, it becomes an issue apparently in a lump sum contract when the Contractor aims at an interim payment on the actual work done at whatever cut off date for suspension. Many will then ask about a sensible approach fair by both parties to deal with payments in case the Engineer wishes to omit the entire scope of suspension, when the resettlement is getting protracted with no tentative date possible for resumption of work.

Unlike in a re-measure contract, the quantities are not re-measurable in lump sum contracts, instead they are taken to be ‘actual and correct’ for the purpose of establishing the contract sum. The contract sum so established shall remain unaltered unless there is a reservation in the contract for variation. Accordingly, only the varied work is valued for the adjustment of contract sum after ‘add and omit’ exercise. The Engineer reserves the right to omit part of work from the contract, which shall be valued as per bill rates and in absence of which by fair rates, and finally the total value of omitted works shall be deducted from the contract sum. Nonetheless, the Contractor is supposed to execute the scope of work shown in the drawings and specifications irrespective of the over or under measurement in theoretical quantities.

The method of valuing work done can be simple as long as the billed amounts are taken in proportion to the actual work physically done at site against the anticipated final quantities measured on construction drawings, under two possible scenarios on quantity variance, as follows;

Quantity Estimated	Unit	Rate	Amount	Quantity done	Quantity obstructed	Quantity final anticipated	Amount payable
100	m2	2	200	60	50	110	109
100	m3	2	200	60	30	90	133

Assuming 'obstructed' quantity is omitted at a later stage;

Quantity Estimated	Unit	Rate	Amount	Quantity done	Quantity obstructed	Quantity withheld	Amount deductible
100	m2	2	200	60	50	50	100
100	m3	2	200	60	30	30	60

The above method of computing the amount duly compensable will not necessarily rectify the errors in estimated quantities in the bill, instead the obligation on the part of the Contractor to execute the full scope of work will be considered in its entirety by extrapolating the 'final anticipated' quantities.

However, care must be taken to avoid overpayment by retaining the value of 'obstructed' work in hand when releasing payment due on the interim bill at suspension, because of the future omissions validly set aside under the contract. Of course in doing so, the Contractor may well be having a legitimate claim for the loss of profit or recovery of his under absorbed overheads in a 'prolonged suspension' that exceeds 90 days as given in some standard forms.

Occasionally, a certificate of partial completion is issued at suspension while treating the balance work separately in terms of defects liability, retention, insurance, liquidated damages etc. Accordingly, the defects liability related to that portion of work starts with the next day onwards for the period as specified in the contract and the Contractor is obliged to carry out any outstanding minor works and rectify defects identified in the snag list if any.

What is imperative is therefore that the Engineer should clearly demarcate the scope of work duly completed (so that the valuation of work done is possible as in a case of valuation at date of forfeiture), evaluate the omitted scope as well as the non executed items (so that the Engineer can reserve such amount for future release or recovery unless otherwise specifically mentioned in payment terms) and issue the partial completion certificate (so that the balance works can be treated discretely).

8.25 Payments at forfeiture

Under circumstances as specified in the contract, the Employer shall have the right to enter upon the site and expel the Contractor without thereby voiding the contract or releasing the Contractor from any of his obligations or liabilities under the Contract or affecting the rights and powers conferred on the Employer and the Engineer by the Contract. For instance, if the Contractor fails to commence the works or shows insufficient progress to the extent which in the opinion of the Engineer will not help him meeting the target completion, or if the Contractor suspends the progress without due cause (beyond a specified number of days after receiving from the Engineer written notice to proceed), then the Employer may himself complete the works or may employ any other Contractor to complete the works. The Employer or such other Contractor may use for such completion so much of constructional plant, temporary works and materials, which have been deemed to be reserved exclusively for the construction and completion of the works. The Employer may at any time sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

The Engineer shall as soon as may be practicable after any such entry and expulsion by the Employer notify the Contractor to attend the necessary evaluation of the works. This is valuation at forfeiture that requires a careful reconciliation. In the event that for any reason the Contractor does not attend such evaluation the Engineer shall undertake the said evaluation in the absence of the Contractor and shall issue a certificate stating the sum, if any, due to the Contractor for work done up to the time of entry and expulsion. The Engineer shall declare the value of the materials whether unused or partially used and the value of construction equipment and any part of the temporary works.

If the Employer shall enter and expel the Contractor under this clause, he shall not be liable to pay the Contractor any money on account of the Contract until the expiration of the defects liability period, and thereafter until the costs of completion and making good any defects of the works, damages for delay in completion (if any), and all other expenses incurred by the Employer have been ascertained and their amount certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall upon demand pay to the Employer the amount of such excess. The Employer may recover this amount from any money due to the Contractor without the need to resort to legal procedures.

8.26 Final accounting

The Contractor shall submit the final account as soon as possible but not later than a period specified usually during the maintenance period. The Engineer shall issue the final certificate within the period specified after above submission provided the necessary details have been submitted within the final account.

Accordingly, the interim valuations are estimates under the contract for the purpose of practical and expeditious evaluation of payments to be made to the Contractor. It should be noted that an interim certificate is not conclusive about anything. Anything included in such a certificate may yet be the subject of a later certificate. It is only the final certificate that is ever conclusive. Amounts included in interim valuations have no bearing on the ultimate settlement of final accounts. However, the necessity for progressive submission and settlement of final account can be established from the beginning of the project in compliance with the primary intention of this provision. When submitted either entirely or in meaningful components, each final account should include substantiation for all variations presented in a clear and logical format with full and particular information. Substantiation of variations should be pertinent, fully corroborated, readily identifiable and in accordance with the conditions of contract.

As soon as any section of work is finally determined or has been completed on site, such section of work can be measured and valued and be submitted with all supporting details in order that the process of verification and agreement may be concluded satisfactorily with expedition. On the other hand, the liability of the quantity surveyor expires after a period specified, usually 2 years, from the date of agreement by the Engineer of the final account as specified in some conditions of engagement for quantity surveying services.

8.27 Final settlement

Final settlement is a part of contract close-out which is the last practical opportunity to ensure that the parties have been fully satisfied with their 'returns'. For example the Employer to ensure that he paid the

Contractor only the amount of money it is obligated under the contract. The Employer's accounting and internal audits are primarily responsible for ensuring that the final settlement with the Contractor is correct. Since many errors in the final settlement of cost are costly, the close-out usually involves a detailed administrative procedure. The purpose is to verify that both parties, the Employer and the Contractor, have fulfilled their contractual obligations and there are no liabilities remaining. In addition, contract close-out is the time to assess the success of the contract and determine if there are any lessons learned for future contracting.

The final settlement does bring about a sense of finality to the negotiations leading up to the agreement of the final account. Both the Employer and the Contractor shall sign the final account statement to signify that the final contract price represents the full and final value of work done including all claims and thereafter no party will entertain any claims whatsoever under the contract. A no-claim certificate as in some contracts takes the similar purpose of a final settlement form.

Just such a situation was recently considered in the Court of Appeal case of *Hurst Stores*[33]. The court found that there was a unilateral mistake by Hurst's PM and that rectification to that document should be made to delete the reference to full and final settlement of all claims etc on the premise that there was knowledge (but not necessarily proven actual knowledge) by the other party of the unilateral mistake. There was ample consideration and no estoppel applicable. A lesson to learn is that if a full and final account settlement statement is signed by mistake (i.e. because of the insertion of terms that give the document a status that had not been noticed by the person signing the Statement) and if it can be shown that the other party had knowledge of that mistake (even if that knowledge was only what might be considered as being "constructive" knowledge) the Courts are likely to rectify the final settlement to remove the offending terms.

Unless expressly provided for within the contract, a final settlement form will probably be viewed as being a document that was previously un-contemplated by the Contract, and as such the representatives given authority to sign documents under the contract would not necessarily have that same authority for signing what would effectively be an ex-contractual document. In nutshell, there is always a possibility of amending any statement. A mere title of final statement does not necessarily constitute finality.

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[33] Hurst Stores & Interiors Ltd v M L Europe Property Ltd, CA 1 April 2004

Reopening after final settlement is another concern. Parties sign a form of statement to the effect that they agree to payment of the balance due on the final account on 'full and final settlement' basis. Payments will not be made unless this form is signed. Where one party, (i.e. the Contractor or sub Contractor), has completed his side of the bargain and agrees to forego an entitlement to full payment, there must be consideration if the agreement is to be binding. In other words the Contractor or sub Contractor must have received some benefit. For example, if the payment were to be made earlier than contractually required this would amount to consideration for payment of the lesser sum to which agreement was given.

The acceptance of a sum less than the Contractor or sub Contractor's due entitlement would be considered as a variation to the contract. If an agreement is made whereby the Contractor or sub Contractor agrees to forego part of his entitlement in the absence of consideration the agreement will not be binding. This is in line with the principle of accord and satisfaction.

It may be however that the final balance includes a sum which was disputed and the Contractor considers the amount in respect of the disputed sum is less that he considers due. Hudson's 'Building and Engineering Contracts' 10th Edition as at page 22 states: 'However, consideration may be present in such a case if some bona fide dispute exists and a claim is given up in return for the promise to accept less.'

This being the case the agreement will be binding. In another court case[34], the Employer told decorators that unless they agreed to accept a sum substantially less than the amount of their account, she would pay them nothing at all. They signed a written document agreeing to accept the reduced payment in full satisfaction of their claim. Later they sued for the full amount. It was held by the Court of Appeal there was no true accord, because the plaintiffs had acted as a result of a threat which was without any justification, and there was no consideration present.

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[34] D & C Builders Ltd -v- Rees (1966)

For accord and satisfaction to be effective one party must have foregone some part of his obligations, e.g. payment in full of all entitlements in return for some form of consideration. Where an agreement is reached but unknown to both parties an entitlement has not been provided for, it could be argued by the Contractor or sub Contractor that the common intention is not reflected by the agreement. The Court under those circumstances may order that the agreement be rectified to reflect the intention of its signatories.

8.28 Payments to consultants

In consideration of the provision of services, the Employer will pay the consultant the fee calculated in the manner provided in the agreement. Payment, in part or in total, of the fee set out in the agreement does not constitute an acceptance by the Employer of the services and does not amount to a waiver of any right or action which the Employer may have at any time against the consultant. Also, the Employer will reimburse the consultant any reasonable costs, expenses, fees or charges incurred by the consultant limited to those items set out in the agreement, provided that in all cases the consultant has first obtained the Employer's prior written approval to incur or pay those costs, expenses, fees or charges.

8.29 Function of certificates

Certificates, generally issued by the Engineer, Employer's Agent or the Contracts Administrator, constitute consent, satisfaction, recommendation, approval or certification of a subject issue under concern. Be it interim valuation, final amount, taking over, maintenance or non compliance, a certificate is a confirmation in writing, documentary evidence and a determinative record of meeting one's obligation or an un-fulfillment of the same. An interim payment certificate is to confirm the work done and in turn the release of net incremental payment due under the contract. Completion or takeover over certificate mark the point of time at which the Employer is entitled to take over the completed works so that insurance obligation related to physical works ceases. Of course, in some contracts, the insurance liability continues till the end of maintenance period. However the liability to insure works transfers from the Contractor to the Employer at some point of time. A certificate of non-completion record the failure by the Contractor to complete by the due date and it is sometimes a condition precedent to deduction by the Employer of liquidated damages. Maintenance certificate constitutes approval of works and finality of the contract. It is issued only on a final inspection just before the expiry of the said period provided that the Engineer is satisfied that all defects have been adequately remedied and there will be no requirement to extend the defects liability period. It will trigger release of any final retained percentage held with the Employer.

The final certificate should reflect the total value of work done by the Contractor. The final certificate constitutes (in the absence of a valid defence) conclusive evidence of the value of the work done and the amount due to the Contractor, and embodies a binding obligation on the part of the Employer to pay that amount. The failure of the Employer to pay within the time stipulated entitles the Contractor to sue on this certificate.

Upon the finality of the certificate, once validly issued, in the absence of a contractual provision to the contrary, can not be withdrawn or cancelled by the Engineer in order to correct mistakes of fact or value in it. Therefore once the Engineer has issued the certificate, he is *functus officio* (has discharged his office) insofar as the certificate and matters pertaining thereto are concerned.

When it is known that the final certificate is not entirely accurate in relation to either the valuation reflected or the amount due to the Contractor, it would not be contrary to public policy to enforce it. Public policy is largely concerned with the potential for manifest unfairness or injustice within a given situation. Where, therefore, the Employer has suffered damage through a negligent failure on the part of either his representative to act in his best interests, he would have an action for damages against them. The situation where the certificate is known to be inaccurate is therefore not one inherently fraught with unfairness or injustice as far as the Employer is concerned.

The final certificate is therefore a final reconciliation statement that denotes the final amount due under the contract after all adjustments made in the contract sum. It will reflect all the deductions and additions that are made as appropriate, including any correction costs of outstanding defects.

Meanwhile, conditions of contract mandate the Contractor also on the issue of some certificates such as no-objection certificate, no-claims certificate, and express undertaking that the works have been completed for the engineer to verify the position of completion. No objection certificate is to expressly allow a freedom of choice on the other party to act or forbid a contractual requirement without affecting its own rights. No claims certificate is to confirm in writing that there will be no more claims of whatsoever nature. An express undertaking as to completion of woks is to call upon the Engineer to undertake proceedings related to taking over of completed works.

Therefore, each certificate has its own function. However, care must be taken to ensure accuracy and validity of such a certificate since it can be contested in a law suit at a later time. Although some contracts confer the ability on an arbitrator to open up review or amend certificates, Courts retain much of the ability to amend the contents of a certificate and set aside any award of arbitration. The 'correction and withholding certificate' provision allows flexibility for the Engineer to make necessary adjustments in a previous interim certificate.

8.30 Summary

A primary obligation upon the Employer is to pay the Contractor promptly and fully the sum of money due under the contract in line with the progress unless there are specific reasons for withholding it. Interim valuations are estimates under the contract for the purpose of practical and expeditious evaluation of payments to be made to the Contractor. Interim certificates are not conclusive about anything. Anything included in such a certificate may yet be the subject of a later certificate. It is only the final certificate that is ever conclusive. Amounts included in interim valuations have no bearing on the ultimate settlement of final accounts.

Conditions of contract sometimes provide the Contractor a right to suspend work if there is non-payment despite of whether the Contractor by virtue of law cannot approbate or reprobate a contract. However, it is not always the case where in some contracts; the Contractor has no choice up until settlement for a claim on interests for delay in honouring certificates, within a reasonable period of time. Meanwhile, conditional clauses are not favoured by Courts on public policy.

CHAPTER 9
COMMENCEMENT, COMPLETION, EXTENSION AND MAINTENANCE

9.1 Introduction

Commencement of works is a landmark that many standard forms of contract give a prominence. The Contractor should commence works within the time frame stated in the contract from the issue of letter of acceptance and proceed with due expedition except as may be expressly sanctioned, ordered by the Engineer or wholly beyond the Contractor's control. With the written orders of the Engineer to commence work, a sequence of operations has been generally stipulated in the project specification. However, the contractual commencement would be the date as specified in the commencement order in case the letter of award or acceptance is silent or referenced otherwise.

Commencement depends also on availability of the site. The Employer shall give the possession of site or access to site, as the case may be. In the event the Employer fails to comply with this clause, the Contractor immediately qualifies for an extension of time and/or additional cost.

Obviously, the Contractor is entitled to possession of whole of the site unless otherwise specified, though access to some parts may not be required till later stage of the project. The area given to the Contractor must be the actual area to be built with a working space surrounding the area earmarked for construction enough to enable the work to be undertaken. The Contractor shall bear all costs for special or temporary way leaves in connection with access to site and any additional accommodation required for the purpose of work. Also, the Contractor shall maintain access for inspection, operation and maintenance of any installations belonging to the Employer, which is not being part of the contract but lie within the site or elsewhere. Use of site has been restricted only for the purpose connected with works. The lands and other places outside the site under control of the Employer shall be used strictly in accordance with the Employer's instruction.

Handing over the site part by part according to an agreed program can also take place in some cases where the public or any other hindrance is apparent or inevitable. Sometimes, the Employer may defer the date for possession on reasonable grounds so that the delay in commencement and deferred site possession must be causally related in a valid claim for time extension. For example, the Engineer has declared 30th January as the day of commencement, but the site is not fully handed over up until 10th February the date he issued another letter informing the handing over the whole site. What date would be considered as the start date for the project? It is sensible that the commencement date remains as 30th January but the Contractor may be entitled to a claim for an extension of the time for completion, depending on how this partial site possession actually affected the site processes. Although it involves the Contractor following the notification and claims procedure, the practical proposition is to adjust the program either by changing the sequence of works or some other alternative in such a way that the scheduled completion is not going to alter. The premise is that the extent of the entitlement might not be as great as the gap of time period but will depend upon many things, including whether the Contractor was denied access at all or was allowed access to commence on part of the works; and, most importantly, whether the delay cannot be mitigated without additional expense.

9.2 Rate of progress

The Contractor has an absolute discretion as to how the work is planned and executed, as long as the works are completed on time. Whilst clause 14 in many standard forms requires the Contractor to submit a program for the execution of works, this in itself does not mean that there is a contractual obligation to adhere to that program. Simply because the construction program is a living tool and basically the date for commencement, completion, milestones and any other specified constraint are only binding. All the other components in a program are likely to change on daily basis by very nature of construction.

Looking back at the manner in which the execution is continuing, the Engineer may take action on the contractual provision that is dedicated for rate of progress. It is generally the clause that imposes upon the Contractor to proceed work with due expedition and without delay which makes in a failure to so comply a ground on which the Employer may be able to determine the continuity of the Contractor's employment. The Contractor shall therefore maintain a reasonable degree of progress with sufficient labour, materials and plant to yield substantial work in accordance with the contract. Applying physical capacity industriously and efficiently, a Contractor may meet the primary intention of this clause. However, if the Engineer finds the existing rate of progress is too slow to ensure due completion, meaning running behind the schedule, he shall so notify the Contractor in writing. The Engineer may approve the necessary steps to accelerate the progress. Acceleration or buying back of time usually occurs when the time of performance is shortened. It occurs when the Employer directs that work be completed earlier than is required by the contract, or the Contractor may be attempting to catch up his own delays. The first one is the Employer's benefit and the second one is the Contractor's.

As a means of acceleration, irrespective of the source, the Contractor is not entitled to any additional payment by working at night or in statutory holidays without consent of the Employer. Site operations in night are not permitted except if the work is unavoidable or absolutely necessary for saving of life or property where the Contractor shall immediately inform the Engineer's representative in a requirement of night or holiday work. This is not applicable for the works customarily carried out by rotary or double shifts. The need for this clause would have arisen from a common law obligation of the Contractor to avoid nuisance to neighbours. This requirement further embodies the need for the workers to have rest time essential for health.

9.3 Practical completion

Practical completion is the completion of all the construction activities (tasks) that have to be done. Completion is something which occurs only after all defects, shrinkages and other faults have been remedied for the Employer's trouble free occupancy. Once a certificate to that effect has been given, it would make the liquidated damages provision unworkable. Usually it means a bona fide completion that is free of known or patent defects so as to enable the Employer to enter into full occupation.

Certificate of completion establishes many signposts in a contract. Basically, the Employer takes possession of works, the Contractor's obligation to insure works comes to an end unless expressly provided otherwise, the liability of the Contractor to pay damages for late completion ceases, the Contractor becomes entitled to the release of first half of retained money, and the defects liability period begins.

Contractually, the Contractor is obliged to complete whole of the works within the period given in the contract subject to any extensions granted. Alternatively, his obligation would be to complete each section of the project if divided, on part by part basis, within the specified period for each section subject to any extension granted.

The Engineer shall issue the certificate of completion usually within 28 days of Contractor's notice provided the Contractor has fulfilled the said requirements. However, it is not stated in this clause as to what action the Contractor should take in the event the Engineer fails to respond positively or negatively to the Contractor's notice.

9.4 Substantial completion

Completion may take several forms such as substantial, partial, stage and practical each having its own commercial and contractual outcome. Substantial completion is the completion to a state which allows the Employer to take over the works in possession and enter into functional or operational occupation but with minor outstanding works which may include remedying defects to be completed in the maintenance period. This is not essentially the practical completion where the works are to be fully completed to a level that the Employer is able to enter into full beneficial occupation.

The Contractor notifies the Engineer when he believes the works have been substantially completed. The Engineer shall then inform the Contractor of any outstanding work to be done before the certificate of substantial completion is issued. The Contractor is obliged to carry out such work for the beneficial use. The beneficial use is only possible whenever the works are completed to the extent the Employer can occupy. Upon the Contractor's undertaking in writing as mentioned, the Engineer shall issue the certificate of substantial completion usually within 28 days subject to completion of further outstanding works during maintenance period.

However, the Contractor has the total responsibility for whole of his work up to the date of completion as determined by the issue of a completion certificate. Subsequent to this date, the Contractor is obliged to make good any defects where his materials and workmanship are found to be defective. The contract generally does not require a complete fully fledged performance by the date for completion so that maintenance period is possible for any installations deemed subsidiary and/or necessary in addition to correction of defects.

Prior to the work being declared substantially complete, the Contractor would have made a list of all known minor corrections, defects to be touched up, and other remaining contract requirements yet to be performed. The Engineer would usually check the list and supplement it with any additionally observed items. This certificate shall be co-signed by the Employer and Contractor indicating their agreement to the respective allocations of responsibility for security, maintenance, heat, utilities, and damage to the work, and insurance. The certificate also determines the time within which the punch list work is to be accomplished by the Contractor. The Employer is then entitled to move in and occupy the premises. The Contractor would then continue with the work of the punch list, completing all remaining contract requirements within the agreed time. The Contractor is not relieved of responsibility for correcting or completing any contract requirement inadvertently omitted from the punch list.

It is also considered that when an Employer occupies or gains beneficial use of a building or facility, that occupation or use will amount to completion of the works even in circumstances where a certificate of completion has not been issued. The recent case of *Impresa Castelli*[35] examined this question in the context of the JCT with Contractor's Design Standard Form of Building Contract.

Substantial completion is the stage in the progress of the work when the work or designated portion is sufficiently complete in accordance with the contract documents so that Employer can occupy or utilize the work for its intended use. Substantial completion is the completion to a state which allows the Employer to take over the works in possession and enter into a reasonably functional or operational occupation but with minor outstanding works which may include remedying defects to be completed in the maintenance period. This is not essentially the practical completion where the works are to be fully completed to a level that the Employer is able to enter into full beneficial occupation.

9.5 Stage completion

This is in cases where the Engineer intends to issue a certificate of completion by stages. If the intention of the contract is to complete in phases, it is essential that the contract document provides for it. A certificate of completion by stages may be issued in respect of specified sections or parts of the work, which completed and taken over by the Employer.

The Contractor shall complete works by a specified date or a specified period, and possibly in stages or sections as specified and shall progress the works regularly and diligently, and finally works to an accepted program, updating when the actual progress differs from the program and revising the program to include corrective measures in mitigating the effects of delays.

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[35] Impresa Castelli -v- Cola Holdings (2002)

9.6 Partial completion

Partial completion is where a part of the works is taken over by the Employer before the date of completion of whole of the works. The Employer takes over some designated work that is completed partially while some of the minor works in progress. In the event the Employer takes possession of any completed work prior to substantial completion then, since the Contractor can not be held directly responsible for the actions of the Employer, the obligations of the Contractor with regard to that work are limited to those conditions pertaining to the period of maintenance as stipulated by the contract.

The associated cost implications upon the issue of a certificate of completion shall apply equally to the work taken into beneficial use or occupancy. In such cases, the Engineer may, issue a certificate of partial completion applicable to the section of work. The Contractor's liability on penalty, insurance and defects together with the right for retention recovery will also be partially limited with the issue of the partial completion certificate.

9.7 Milestone completion

Milestone completion has a strict deadline for completion of each segment of work designated as milestones. When a milestone completion is absent under the contract, being a patent defect, and the Contractor becomes eligible for extension, the Engineer has no option but to grant the Contractor a period of extension to the contract as a whole. This is no longer sensible as it unduly benefits the Contractor for time extension for the entire contract even on an excusable delay at any single location and penalizes him on delay in completion of work at any single location despite of timely completion in other locations. The contract should specifically provide for 'milestones' and such a requirement shall be stated under conditions. If the intention of the contract is to complete in milestones, it is essential that the contract document expressly provides for it, as it is entirely a different contractual machinery, where the certificates of completion by milestones are issued in respect of works that have been taken over by the Employer for his beneficial use and accordingly the insurance, defects liability, penalty etc will take effect.

For instance, road projects where the scope of works can be easily grouped into mileages, chainages, areawise or tradewise, can have milestone completion targets. Each individual segment can therefore be treated discretely for the purpose of time extension, liquidated damages, retention, insurance, defects liability etc, etc. This will avoid illogically granted time extensions and prolongation costs.

9.8 Early completion

The fact that a Contractor is able to complete a project on time or ahead of schedule, notwithstanding the complained-of delay, will not provide any defence to the Employer against suspension of work or breach of implied duty claims. An Employer may not prevent a Contractor's early completion of his assignment with impunity. Based on the duty not to hinder or delay the Contractor, Courts have recognized the right of a Contractor to complete earlier than scheduled.

To prevail in its claim for early completion, the Contractor must demonstrate that its planned schedule for early completion was both reasonable and attainable. However, it is not necessary to the Contractor's recovery that the Contractor communicates its intent to finish early to the Employer. In some contracts, there is a bonus scheme to persuade early completion since the bonus to incur is much more advantageous than losing 'early birds' in return on capital investment.

9.9 Extension of time

The primary purpose is to enable granting extension of time for contractual completion so as to prevent the time being set at large and to preserve the Employer's right to deduct liquidated damages for late completion.

Typically, the time extension clause deals only with the time extension and does not address anything related to additional payments. It specifies the sequence of action for granting extension of time. As a principle, an extension of time can only be validly granted if the procedures, which the contract lays down, are strictly followed. The Contractor shall submit full and detailed particulars of the delay he suffered within the period as specified after such occurrence or as soon as are practicable. The Engineer shall investigate such submission and refer to the Employer with the time and cost implications, along with the basis of his decision. Once the decision is confirmed, the Engineer shall notify the Contractor accordingly. The Engineer's decision is final and binding.

9.10 Extension of phase completion

Whenever projects are classified into phases with individual target completion dates, the contractual treatment in terms of commencement, completion, and maintenance must be autonomous. The autonomy shall govern the mechanism of insurance, retention, advance recovery, defects liability and so forth. However, in some cases, the Contractors argue that the delays were caused by a considerable amount of modifications to the original scope and as a result, indirectly affected works related to other on going phases, so that the Employer should grant time extension for the whole project. It may not, however, specifically agree to extend the start date or date of completion of any other phase of the project that might arguably be affected by the delayed completion of the first phases.

Contractor may argue that if the Employer extended the time for completing one phase, it must be assumed that the time for starting and completing the next phase would likewise be granted a time extension. On this issue of whether the project completion date should have been extended due to the extensions on the individual phases, it can be found that the change orders were self contained and that the change in the completion date for one phase of the contract does not lengthen the period of time in which a subsequent phase was to be completed, unless expressly provided. However, it is a question of technical arrangement by the Contractor in cases his method statement is crystal clear to establish a technically valid ground to win the case.

9.11 Extension decreased subsequently

Time extension is to prevent the time for completion becoming at large and relieve the Contractor from liquidated damages for delays beyond his control only. Once granted, time extension can not be decreased subsequently such as in a reduction of time for completion in case of a substantially omitted scope of work. However, EOT may be granted incrementally in cases where Employer's risk portion is not predictable in prospective claims, subject to mutual consent in writing that previous time extension can be revisited once the effects cease as the work progresses. Any time impact due to omission of work which results in a negative extension can also be considered in the next application for time extension, subject to how parties agree in the contract.

9.12 Delay events

Events warranting an extension of time would include many valid reasons. Amongst them are additional work such as those included in the Engineer's instruction for adjustment of ambiguities in contract documents, extra work included in any supplementary drawings or instruction, instruction to rectify damage from Employer's risk, instruction to uncover, make openings in or through, reinstate and make good any part of the works where such part is found to be executed in accordance with contract, instruction issued before the completion of works to remedy defects, shrinkages or other faults for which the Contractor is not liable as a result of search, instruction issued before the completion of works to search where any outcome is other than a liability of the Contractor, instruction to replace or rectify destruction from special risks, etc.

They also include any cause of delay referred to in the conditions such as Engineer's failure or inability to issue any drawing or instruction, physical obstruction or condition not foreseeable by an experienced Contractor, instruction for dealing with fossils, tests required by Engineer, suspension, failure on the part of the Employer to give possession of site, exceptionally adverse climatic conditions and other special circumstances which occurred other than through default of the Contractor.

Events related to design changes may also cause time extension and adjustment in the contract price. Design changes may be due to modification in type, method of construction, or in materials for incorporation into permanent works which can even be in terms of colour, pattern, gauge, thickness, weight etc. The Engineer may issue instruction in a discovery of a defect reasonably unforeseeable by an experienced Contractor, not contemplated in the original tender or omission on the tendered scope subject to recovery of additional cost and time. However the rectification of a default of the Contractor which is expedient as a satisfactory remedy authorized by the Engineer shall be executed at the cost of the Contractor.

For extension of time to be granted, the weather has to be exceptionally adverse. The intention is that the Contractor should allow for fluctuations in the usual pattern of weather and climate. Mere submission of rainfall data for instance does not establish a valid claim for the grant of extension of time. The risk of weather is to be borne by the Contractor who will presumably price the tender accordingly. An examination of local weather records shall establish what is normal for the locality, which helps identify the 'exceptionally adverse' weather. There can be no extension of time unless the whole project is actually or potentially delayed. The actual facts on the site must be investigated to determine whether the occurrences referred to above affected any site operation critical to the scheduled completion.

9.13 Interim approval on time extension

Only a handful of standard forms provide a mechanism for interim approval on time extensions. Although it does not however restrict the parties for mutual agreement, there is a valid argument for an interim level assessment whenever the effects of some delay events are either invisible or continuing such that the Contractor can not submit detail particulars enough to safely conclude his time impact analysis. On receipt of such interim claims, the Engineer shall make an interim, or sometimes called, tentative, provisional, or subject to, determination of extension of time. Once the effects cease, the Contractor shall submit the final claim for overall determination giving due regard to the circumstances involved. It is a matter for the Engineer to take utmost care when determining time extension prospectively since time extension once granted can not be reversed unless otherwise parties mutually agree or stated in the contract.

The Engineer owes a moral obligation to form a technical opinion on the question where the completion of work is likely to have been or has been delayed for any of the reasons unless and until the Contractor has submitted full and detail particulars of the delay. Where the Contractor fails to serve a proper delay notice this will not result in the loss of right to an extension of time unless the contract expressly states that the notice is a condition precedent to the right to an extension of time.

The time extension clause does not specifically empower the Engineer to extend time retrospectively. The purpose of extending time is to give the Contractor a date to work towards. However, a Contractor who wishes to claim an extension of time must at all times have used his 'best endeavour' to prevent delay in the progress of work. It will not be enough for a Contractor to demonstrate that according to his program delay fell on the critical path. It is actual not planned progress that is relevant. Giving notices, keeping records and updating program is essential ingredients of a successful claim of time extension.

9.14 Time at large and reasonable time

Time at large is a situation where the Contractor is prevented from completing by the completion date and there is no right to extend time nor is it properly extended so that the Employer can no longer insist upon the completion date and time is said to be at large. The test is that how the parties have come to be without an enforceable completion date and secondly how a reasonable time to complete be calculated. The essence is that the promisee cannot insist upon the performance of an obligation which he has prevented the promisor from performing. This is prevention principle that the Employer cannot hold the Contractor to a specified completion date, if the Employer has by act or omission prevented the Contractor from completing by that date. Instead, time becomes at large and the obligation to complete the project by the specified date is replaced by an implied obligation to complete within a reasonable time.

If time does become 'at large', the Contractor's obligation is to complete within a reasonable time. What constitutes a reasonable time is a question of fact. The principles to be applied are those in *Pantland Hick v Raymond & Reid*[36]. This is in relation to circumstances which existed at the time when the contract obligations are performed, but excluding circumstances which were under the control of the Contractor. In *British Steel* case[37], Lord Goff applied these principles by first considering what in ordinary circumstances a reasonable time for performance was and then considering to what extent the time for performance of the Contractor was in fact extended by extraordinary circumstances outside his control. Whether a reasonable time has been taken to do the works cannot be decided in advance, but only after the work has been done.

In *Shawton Engineering v DGP International*[38], there were variations to the contract but there was no contractual mechanism for extending time on account of the variations. It was accepted that the effect in law of the variations was that DGP became obliged to complete their work within a reasonable time. Shawton sought to terminate the contract on the basis of DGP's breach of contract of failure to complete. DGP stated that they were not in breach, because on the facts a reasonable time had not expired.

The Court of Appeal held that a reasonable time had to be judged at the time when the question arises in the light of all relevant circumstances. One of the circumstances was the original contract date, even if DGP had underestimated the work content.

Equally, the true work content was a relevant circumstance. The mere instructing of a variation after the original date for completion would not by itself necessarily mean that a reasonable time had to be assessed afresh by reference only to the variation.

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[36] Pantland Hick v. Raymond & Reid, [1893] AC 22))

[37] British Steel case Corporation v Cleveland Bridge & Eng Co [1981] 24BLR100

[38] Shawton Engineering Ltd -v- DGP International Ltd and Others, CA 2005

In commercial contracts the parties usually intend the works to be completed by an agreed date. In many contracts the date for completion will be stated as an express term. The term 'time at large' is not a legal term, but describes a situation where there is no definite date for completion, either by absence from the contract terms or arising from events. Time is said to be 'at large' because the date for completion is not fixed before carrying out the work, but determined after the work has been commenced and/or completed. Whenever the time is of essence, any violation of deadlines will amount to a breach of contract. 'Time is of essence' can be presumed in some contracts but typical construction contracts are not in essence of time since the failure to meet scheduled completion does not invalidate a contract and is not the sole reason to terminate a contract.

9.15 Employer's delays

There was an issue in a UK court case[39]. Defective work was discovered before practical completion had been achieved. The Employer was responsible for long delays due to its failure to approve a scheme of remedial works. A dispute arose concerning the Contractor's entitlement to an extension of time. However, there was no specific provision included for an extension of time when the Contractor is delayed by the Employer.

The Court of Appeal considered this to be a fatal shortcoming. Where an act of prevention such as a delay in approving a remedial scheme causes delay it is essential that the contract includes a provision for the granting of an extension of time. In the event of a lack of such a provision the completion date falls away and the Contractor is obliged to finish in a reasonable time. As a result of the completion date no longer applying the Employer is unable to apply liquidated damages even though the Contractor may be responsible for some element of the delay to completion.

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[39] Peak Construction (Liverpool) Ltd v McKinney Foundations Ltd (1970)

The primary idea of including an EOT provision is to preserve the Contractor's obligation to complete within a specified time and in doing so to prevent the Employer's right to LD when by his acts, the Employer has delayed the Contractor and is responsible in part for late completion. The fact that the Contractor is the obvious recipient of benefit in gaining relief from LD is a secondary outcome. In fact, in the absence of EOT provisions, a Contractor would be able to successfully contest the LD provisions when the Employer contributes to delays. All what Employer gets out of LD provisions is the relief on the burden of proving his loss and the right to deduct LD from sums due to the Contractor. To the extent that the Employers' true losses may be greater than the stipulated level for LD the Employer is disadvantaged by agreeing to a restrictive remedy. On the other hand, LD provisions are beneficial to Contractors for they not only limit their liability for late completion to the sums stipulated, but they know in advance the extent of risk in late completion. If such provisions are not in place, the Contractor would be able to claim 'time at large' and the Contractor's obligation would be to complete within a 'reasonable time' presumably that the clause 14 program is the basis in order to be consistent with the bargain which both parties entered into. Accordingly if the Employer carries out some act that prevents the Contractor completing the works by the date for completion, for example failing to give possession of the site on due date, then he can no longer insist that the Contractor finishes his works by the stipulated date for completion. This principle has been established in the case of Holme vs Guppy far back in 1838.

It was also noted in *Biltoin* case[40] that the main Contractor is bound to complete the work by the date for completion stated in the contract if he fails to do so; he will be liable for LD to the Employer, subject to exception that the Employer is not entitled to LD if by his acts or omissions he has prevented the main Contractor from completing his work by the completion date. On the other hand, if the Contractor intends to avoid LD by showing his entitlement for EOT, he must produce evidence to prove that; his program at the time was realistic and he could have achieved targets, he was achieving the pre-planned rate of progress, a delaying event occurred, cause of the delay gives a EOT entitlement under the contract, delaying event affected the rate of progress of relevant activities, and the effect to such activities has affected the completion date – indeed a chain in the burden of proof for any typical claim.

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[40] Biltoin vs GLC (1982)

On the other hand, the Employer does not need to prove actual damages but LD's are not usually enforceable if imposed as a penalty. Two cases, *Dunlop Tyre*[41] and *Philips HK*[42], provide some guidelines for distinguishing between LD and a penalty. In short, it is a penalty if the sum is excessive in amount in comparison with the greatest loss conceivably followed from the breach'. Accordingly, a party can challenge the validity of a LD's sum after the contract has been signed. However, a Court may be slow to interfere with a LD clause negotiated at arm's length between parties having commercial interests. In particular, the Court will not be impressed by arguments that the actual loss suffered is less than the estimated damages, unless the discrepancy is so large that it demonstrates that the sum could not have been a genuine pre-estimate of the likely loss.

9.16 Penalty imposition

A common belief is that time extension (EOT) provisions are for the benefit of the Contractor and liquidated damages (LD) for the benefit of the Employer. However, this belief is not only wrong but promotes the reverse of true intensions. LD is an early calculation of the expected loss under the contract whereas penal damages are to treat the Contractor in a punitive sense probably beyond the actual loss. Even if two parties genuinely and without coercion wish to consent to a contract which includes a penal clause, they are unable to, in strict legal terms, subject to however that in some cases, Courts uphold the application of contractual provisions. LD should be a genuine estimate of the likely loss provided the true intension is to persuade timely completion. If the intention is to counter slow progress, then there is a separate provision in the contract where the Engineer calls for a recovery plan that is technically feasible, because it is not that easy to reverse penalty.

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[41] Dunlop Pneumatic Tyre Co Ltd v. New Garage & Motor Co Ltd [1915] AC 79

[42] Philips HK Ltd v The Attorney General of HK (1993)

In essence, the decision in Dunlop Pneumatic case was that there must be a presumption that liquidated damages clauses must be valid and can not be a penalty that is not enforceable as a matter of public policy. Courts also contend that liquidated damages are to be treated as an 'entire remedy': This means that the liquidated damage is to be treated as a comprehensive remedy for the breach to which it relates - for example delay.

However, penalty and LD has no difference in some countries where Employers impose penalty subject to a ceiling limit, without fear of being contested in Courts. Although the Contractor's exposure to penalty starts only when he fails to achieve scheduled completion, there are notable exceptions. Levying penalty starts according to a schedule of eventualities qualified already in the contract. These may be for instance in a road project when the Contractor delayed in commencing some designated trench work or even a section of asphalt work. There are cases where penalty is applicable in delay in either commencement or in completion of almost all the individual activities, shown in the bar schedule. A delay due to submission of a traffic management plan would even be a case for penalty in addition to usual delay in completion of whole of works, to the extent where the Engineer has been given discretion to consider further penalty if he deems required. However, this discretion has no legal effect, so is a 'dummy' clause that is non-enforceable when the other eventualities meet the ceiling limit. Contracts with full of penalty events keep the Contractor in a very inflexible setting that restricts him in managing the project, definitely upsets the Contractor's technical movements freely within the project and tilts the even risk apportionment in the contract.

Any subsequent improvement in the progress to catch up delays is not a matter to waive off penalty, and in fact is a Contractor's obligation under the clause, Rate of Progress. However, a request to reverse penalty already imposed on the contract can not be based on 'good conduct' which is immeasurable and is a pure subjective opinion as the Engineer on what truly happened on the project. But they are not reasons valid enough to reverse penalty as such. In fact, there is no discretion conferred on the Engineer under the contract to reconsider penalty even in cases where the Engineer deems desirable. There is no mechanism for penalty reversal, expressly or impliedly, given in the contract also.

Where the Engineer issues a variation after the contract completion date but before practical completion, it is appropriate where resultant delays occur for an EOT to be granted. Such EOT will be calculated by extending the completion date by the net period of delay. In a court case involved *Balfour Beatty Building Ltd*[43], it was held that gross period up to the time when the varied work had been completed was not the correct measure of the EOT but the period of delay is to be added to the contract period or the extended contract period as the case may be while a variation issued during a period of culpable delay would not render time at large. This is fair by one way because it avoids excusing the Contractor from his own delays during the period under LD or penalty. However, where the contract stipulates that time is of essence, failure to meet the particular date is a fundamental breach of contract entitling the other party to treat the contract as repudiated and claim damages. Time is rarely of the essence in a construction contract because the effect of such a provision is that if the building is not completed on a certain date then the Employer does not want the building at all and will treat the contract as repudiated, which is not the reality.

It is always up to the Contractor to justify his basis and quantum of entitlement with the contemporary records in support so that the Consultant shall revisit the entire issue and establish his verified final opinion on the net resultant impact on the scheduled completion in line with the contract principles after taking all the circumstances into detail consideration. It is illogical to consider payment on time-related preliminary items as it would not realistically give a 'fair entitlement' since the basis of reimbursement might change from case to case depending on the causes of delay and their impact. For instance, an initial delay in the commencement itself due to Employer's fault or his request would shift the whole schedule towards a definitive period so that the Contractor shall be compensated on pro-rata basis on time related preliminary activities, that are directly affected because of the delay.

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[43] Balfour Beatty Building Ltd -v- Chestermount Properties Ltd (1993) 62 BLR 12

9.17 Cascading effects of delays

In *Liberty Mercian Limited v Dean & Dyball Construction Limited*[44], the parties agreed for the construction of four retail units to be in five phases and provided liquidated damages in respect of each of the dates. It was JCT Standard Form of Building Contract (1998 Ed, 2003 Revision). Phased possession was found to be commercially important because the retailer (the occupier) wished to continue trading from its old store until the new retail units were ready for fitting out.

The sectional completion schedule provided for a fixed date of completion for each phase of the works, but a variable date of possession which fell on the date of completion of the preceding phase. The Contractor was found by the architect to have caused four weeks of culpable delay in Phase 1. However, in consequence, each of the subsequent four phases was similarly delayed by four weeks.

The Employer sought to impose LDs for 20 weeks of delay (i.e. four weeks for each phase). The Contractor argued that it ought not to be 'penalized' for the same four week delay five times over. Mr. Justice Coulson found that there was nothing wrong with the Contractor having to pay liquidated damages for a 'cascading' delay from Phase 1 to the subsequent four phases of the works. He reasoned that the Parties would have been aware that a period of culpable delay in Phase 1 would cascade to delay in subsequent phases. He also observed that the different rates for liquidated damages for each phase was representing different losses unique to delays in each phase, which flawed away the argument of penalty but genuine pre estimate.

Basically, the Contractor will not be entitled to an extension of time necessitated by its own default. The premise behind is that a wrongdoer ought not to be able to take advantage of its own wrong. Accordingly, the Court was not in a position to support the 'cascading' argument, in any way.

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[44] Liberty Mercian Limited v Dean & Dyball Construction Limited [2008] EWHC 2617 (TCC)

9.18 LD repayable after time extension

In the case of *Reinwood Limited v L Brown & Sons Limited*[45], the Employer had served a withholding notice timeously, deducting liquidated damages for the Contractor's delay in reliance on the architect's earlier non-completion certificate. Three days after the sum stated in the interim certificate had been paid to the Contractor (after deduction of the withheld amount), but prior to the final date for payment of the interim certificate, the architect granted an extension of time which in turn decreased the amount of liquidated damages payable.

The question was whether the Employer was in default for not paying the balance of the amount due to the Contractor before the final date for payment. On the same token, whether the extension of time deprived the Employer of the right to withhold in reliance on the non-completion certificate.

The Courts found that the Employer must, within a reasonable time, re-pay the liquidated damages after a new completion date has been set, and that the effect of the extension was to cancel the non-completion certificate upon which the Employer's right to deduct depended. Thus, the Employer's withholding notice, issued in reliance on then the valid non-completion certificate, itself remained valid notwithstanding the subsequent 'cancellation' of that certificate.

9.19 Instructions issued during the period under liquidated damages

Time impact due to variations during extended period under liquidated damages is added back to the prevailing contract completion date unless the delay behind the issue of variation is apparently because of the delay in works on the part of the Contractor. In other words, where a delay event for which the Contractor is liable occurs after the date contractually due for completion, and following a period of delay which would give rise to an extension, the effect is to wipe the slate clean and disentitle the Contractor from recovering an extension for the earlier period of delay. This means the Contractor can not be relieved from the previous delays of his own.

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[45] Reinwood Limited v L Brown & Sons Limited [2008] UKHL 12

Also, the Employer shall take the benefit of relying on his own delay that is subsequent to the delay event responsible by the Contractor, unless the Contractor establishes that the subsequent delay event caused by others, when he was ready to commence or continue the delayed works, so that he was prevented completion or recovery efforts on the delayed works. However, recommendation on one case does not establish precedence over the next case but depends entirely on the facts.

9.20 Pending completion on the Employer's delay

Major work pending completion would mean that there is a trouble in occupancy. However taking over would be possible in certain circumstances where the tests on completion has been passed without major snags that may prevent the operation or occupancy of the building, despite the installation of a plant or any other electro mechanical component to be supplied by the Employer, for instance, supply of switchgear, although the item is cost significant, wherever the whole system can run on stand by temporary supply as envisaged by the design intent, till the permanent supply is in effect. As such, it is the date the flow has been diverted, tests on completion have been passed and substantially completed that enabled the Employer to start operations.

The logic behind the above argument is that the completion is the fulfilment of obligation to complete the construction and/or installation of works that should be free from known or patent defects and that any outstanding works is minor, so that the Employer's intended use or occupancy is not prevented.

Contracts generally do not require a complete fully fledged performance by the date for completion but the maintenance period is also possible for other installations deemed subsidiary in addition to correction of defects. Accordingly, the activities connected with the Employer supplied materials (perhaps without hindering the key technical objectives of the project) can be considered to be taken place during the defects liability period and the Engineer can issue the Taking over Certificate. The answer largely depends on the facts, more than how the contract has been worded as to when rightly due for the issue of Taking over Certificate.

9.21 If disruption is caused by the Employer?

If disruption is caused by the Employer, it may give rise to a right to compensation. The SCL protocol states that disruption has a different meaning to delay. Disruption is the loss of productivity, disturbance, hindrance or interruption to the progress of a Contractor. Unlike delay, the disruption may not lead to late completion of the work. Generally, the Contractor is only able to recover disruption compensation to the extent that the Employer causes the disruption. Although many standard contracts do not deal expressly with disruption, a Contractor should maintain site records to establish eligibility and quantum thereafter.

The Contractor shall give written notice to the Engineer when planned progress is likely to be disrupted. The notice shall include details of the above resources and of why and by when it is required and of any disruption likely to be suffered if it is late. It may be necessary to demonstrate that an orderly and timely sequence of events was affected by causes beyond control of the Contractor who was prevented from working in order to illustrate the effects of disruption. It is however difficult to assess the cost of disruption for each individual element, which in themselves may be small but with frequent recurrence is significant. A global claim may be more appropriate where it is overwhelmingly self-evident.

9.22 When issues have been inextricably intertwined!

A contract generally prescribes how the parties should act upon when a dispute arises. This particular contract for the purpose of discussion has a 'no-damages for delay' clause. The sub clause 67(2) specifies that a dispute, having in the first place been referred to by the Engineer, and if further disputed, shall be referred to the Competent Court of Justice subject to a 15 days written notice of intention to do so. The Contractor having disregarded this provision has referred the dispute to the Claims and Compensation Committee which is an independent body operating outside the contractual machinery.

The Contractor claims 175 days extension and an additional interim payment of $ Million 67 (62 Million as prolongation cost and 5 Million as price escalation) warning that there will be more claims in time to come. The consultant's assessment is 105 days at a cost of 47 Million, as an 'interim award' reserving rights with the Engineer to adjust this amount if necessary in a subsequent claim.

The subject claim is an interim claim up to and including 31 Dec 2006 (effects are continuing as per the Contractor so that he can submit any number of claims till the effects cease). It has two components; extension of time and additional cost due to disruption occurred in five selected road segments, specifically excluding the cost of unproductive working (i.e., loss of productivity). The Contractor says delay events are widespread and only the main events have been considered.

The main source of claim is the disruption resulting from existing utilities that were in excess of utilities indicated in contract drawings, utilities not in the locations indicated in drawings, inadequate service corridor space provided in the Employer's design, existing utilities already situated within the corridors, unforeseeable underground cavities, re-design of pump stations, encroachment on the Contractor's right of way to an underpass and a part of expressway, prevention of trail excavations and utility relocation until completion of international games and traffic diversion and top of all the excavations suspended during progress.

The consultant's key remark is that the Contractor has not given due consideration to mitigate delays in getting approvals for various submittals such as method statements, work schedules, quality assurance plans, and inspection and testing plans so that no operation could take place before approval on submittals as per the contract. This obligation is fundamental in setting the pace, and according to the consultant, there's a significant difference between the planned date and the actual date of commencement.

At the outset, it is a question of law to be determined whether the Contractor's direct reference to the said Claims Compensation Committee is contractual, permissible and judicially capable of adjudicating the case. Also, there can be interim claims but interim awards on interim claims are nor conclusive neither sensible. There is a possibility for the Contractor to amend or update the contents at a later time whether the same is contained in submission or otherwise. Although the Contractor may adopt his own fashion in articulating a claim, as he deems strategic, this kind of splitting (on the basis of causes, location, and timing) might miss out facts relevant and complimentary each other (due to very nature of the claim) and result in duplication as it does not take the overall picture in one-go. Hence, it is important to look at the entire scenario from a broad perspective.

However, the consultant's grant of 105 days has been solely based on time related preliminary items on pro rata basis, instead of individually evaluating the Contractor's facts and figures related to above sources of claim so that the positions where the parties stand in each case are not comparable. The consultant should have evaluated the claim itself submitted by the Contractor instead of making his own unilateral assessment.

Where the Employer is responsible for disruption to the progress of works i.e., where he has disturbed progress (including the items off the critical path after full absorption of the float available) so that the Contractor is not delayed in the completion of work but has suffered additional costs in completing the works, the Contractor may claim the cost of wasted or increased overheads incurred as a consequence of the disruption. As with other claims, the principle problem with providing evidence in support of such claims is not so much in identifying the actual cost incurred but in satisfying the Engineer that any additional cost claimed arises as a result of the event relied upon. In other words, the challenge is to convince the Engineer in technical terms that, but for the disruptive event, the cost to the Contractor would have been less than it actually turned out to be and that the difference arose as a result of the disruption.

The burden of proof lies entirely with the Contractor by showing that the delay was unforeseeable, uncontrollable, critical and causative, so that the circumstances made the scheduled completion shifted, considering concurrency (where two or more delay events arise at different times, but the effects of them are felt, in whole or in part, at the same time where both the Employer and the Contractor are causing delay). The Contractor does get the extension of time but he is only entitled to any loss and expense incurred as a specific consequence of the Employer-caused delay. This basically means that if the Contractor is able to identify extra costs at the activity or event level, he recovers these but not the general running costs of the project.

The Contractor should nevertheless be entitled only for the actual loss and not the actual cost (in other words, the difference between the actual cost incurred in delay and the cost that would have incurred under normal circumstances as planned for which the contract rates are inclusive of basic cost, overhead and profit). The sum so arrived will eventually cover up any escalated component in prices of materials and labour and any loss of productivity. No claim on the same issue can be entertained thereafter. This will avoid possible over-compensation but bring the losing party to the original position financially had there been no disruption of his own. The extent of entitlement for extension has to be decided on the foregoing principles.

The history of the above case goes far back in 2006. The Contractor's total cumulative claim to date exceeds 487 $ Million and his claim for extension is a total period of 784 days. Considering the nature, amount and the criticality of the project, it was recommended that the Employer may refer to an amicable settlement on mutual consent so that the parties obtain a third opportunity within the contractual machinery to revisit the entire case and come to a settlement which shall be final and binding.

Hence, what should have been the best approach? Often, a construction contract contains a written notice provision governing claims, allowing parties to initiate alternative measures in curbing delay/s without technical sacrifice within the bounds of cost, time and quality. If the Contractor fails to give proper written notice of a claim, the Employer may assert this failure as a defence to the Contractor's claim. The Contractor may of course lose his right to claim if notice is a condition precedent to lodge his claim.

9.23 No damage for delay

In the case of *Clifford R. Gray, Inc. v. City School District of Albany*[46] where an electrical Contractor was delayed in completing its work and the Employer asserted that the Contractor's claim for delay damages was barred by a 'no damages for delay' clause in the contract. The contract stated: 'Contractor expressly agrees for itself, its sub Contractors and suppliers not to make, and hereby waives, any claim for damages on account of any delay, obstruction or hindrance. Contractor's sole remedy for any delay, obstruction or hindrance shall be the extension of the time'. The trial Court concluded that the clause did not bar the plaintiff's claim, and the appellate Court agreed. Delays were caused by actions of the Employer as well as by the construction manager's failure to adequately coordinate the work of various Contractors and failure to prepare the construction schedules and drawings.

The Court explained that damages may be recovered for (1) delays caused by the Employer's bad faith or its wilful, malicious, or grossly negligent conduct, (2) delays that are not contemplated at the time the contract was made, (3) delays so unreasonable that they constitute an intentional abandonment of the contract by the Employer, and (4) delays resulting from the Employer's breach of a fundamental obligation of the contract.

In this case, Phase II of the construction was to be for 10 months and be finished in February, but was finished in September instead. Phase III was completed almost a year later than planned. One of the causes of delay was that the Employer terminated both the construction manager and the general Contractor, and hired 30 sub Contractors in lieu of replacing the general Contractor. According to the Court, the project impediments were wholly unanticipated and, according to expert testimony, were of a character and magnitude not ordinarily anticipated by parties to a contract of this nature. The Court also found that the construction management team failed to substantially fulfil the express contractual obligation to schedule and coordinate the work, resulting in extensive work interruptions or delays and inefficient labour deployment, and that this justified the trial Court finding a breach of contract.

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[46] Clifford R. Gray, Inc. v. The City School District of Albany, 277 A.D. 2d.795

The Employer also has an implicit duty not to actively interfere with the Contractor's progress. In *Phoenix Contractors, Inc v General Motors Corp*[47], the Employer ordered the Contractor to stop work to allow another Contractor to perform its work. The contract had not identified this conflict, and the Employer refused to grant the Contractor an extension of time to complete its work. The Contractor completed its work on time, but filed an acceleration claim, asserting that it had to expend additional resources to make up the lost time. Although the contract included a "no damage for delay" clause, the Court allowed submission of the acceleration claim to the jury because there was sufficient evidence of 'active interference' i.e., an affirmative wilful act in bad faith which unreasonably interfered with the Contractor's performance.

9.24 Approval of works

Period of maintenance shall mean a period of usually 365 days calculated from the date of issue of completion certificate. However, the Contractor's liability for maintenance formally expires within a number of days usually 14 days after the 365 days dedicated for maintenance in some cases. Typically such a period might be of the order of 12 months on a major construction contract, could be as little as 3 months on a minor construction contract, or could conceivably be for 2 years or more on a complex industrial project requiring lengthy commissioning and monitoring periods for equipment.

During that defects liability period, the Contractor will usually be expressly obliged to return to the site and rectify defects which become apparent. Fair wear and tear has been exempted from the scope of liability. Accordingly, at practical completion, part of the cash retention or bank guarantees will usually be returned to the Contractor, and the balance of the cash retention or bank guarantees will be retained throughout the defects liability period. That security which is retained throughout that period is retained for the purpose of, should the need arise, the Employer rectifying such defects.

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[47] Phoenix Contractors, Inc. v General Motors Corp., 135 Mich App 787 (1984)

Only the maintenance certificate constitutes approval of works. The Employer cannot recover any cost of correcting defects, which appear after the issue of maintenance certificate except in situations specifically mentioned in the contract. Maintenance certificate is the conclusive evidence that the Contractor had complied with all the contractual obligations. Hence, the maintenance certificate constitutes finality of contract. The Engineer is obliged to issue the maintenance certificate again usually within 28 days of expiry of the last date of maintenance period. If however, he finds any defect not rectified, he should inform the Contractor in writing and the certificate should be issued only after such defects are rectified. This is coupled with the clause 'Cessation of Employer's Liability' which states that if the Contractor has any claim on the Employer, he must put forward such a claim in writing before the issuance of maintenance certificate. The Employer's liability automatically ceases with the issue of maintenance certificate.

In some contracts however, performance of the Contractor's obligations shall not be considered to have been completed until the Engineer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Engineer shall issue the performance certificate, instead of the maintenance certificate, usually within 28 days after the expiry of defects liability period and as soon thereafter as the Contractor has supplied all the Contractor's documents and completed and tested all the works, including remedying any defects. In the case where many partial completion certificates have been issued, it will be after the expiry of the latest defects notification period, unless otherwise specifically mentioned in the contract. The time gap between the date of performance certificate and the expiry date of individually calculated defects liabilities against each partial completion certificates will be subject to decennial liability unless the Engineer extends their individual defects liability periods on valid technical reasons.

As per FIDIC Red book, the Employer shall be entitled to an extension of the defects notification period for the works or a section if and to the extent that the works, section or a major item of plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or damage. However, a defects notification period shall not be extended by more than two years.

9.25 Condemnation at final inspection

It is possible for the Engineer to regularly inspect works, certify the same for payment and at a later date condemn a large portion of work. This often leaves Contractors in a hard position particularly when they have passed on payment for the work to sub-Contractors which in many instances cannot be recovered.

Even though the Employer may have accepted the work so that a liability to pay for it arises, that will not prevent the Employer from showing that the work is incomplete or badly done instead he may either counterclaim or set off damages in an action by the builder, or he may pay or suffer judgement to be obtained against him for the full price and later bring a separate action for his damages.

Sometimes, a certificate of final completion is the Engineer's written confirmation that the Contractor has completed everything as contracted including variations and has done so to the complete satisfaction of the Engineer. It moreover signifies that the work is free from all defects, save for possible latent defects.

The final certificate shall be conclusive evidence that the Contractor has discharged all his obligations, and it cannot therefore be impeached by the Employer. Nor can it be withdrawn, because, having issued it, the Engineer has become *functus officio.* It will not avail the Engineer to say that he inadvertently overlooked certain patent defects; he will be deemed to have condemned these defaults, and the Contractor cannot be compelled to attend to them.

The Engineer carries a very heavy responsibility in issuing a certificate of final completion, and he may be held liable if he negligently overlooks anything. It should therefore be issued only after the works have been thoroughly and meticulously inspected and checked against the various contract documents and instructions. As he may be held vicariously liable for negligence on the part of the other agents, he should ensure that they have made similar inspections and checks before the certificate of final completion.

9.26 Finality of final certificate

The final certificate usually excludes any further claims being made by the Contractor under the Contract. At that time, the balance of any cash retention or security monies will be returned to the Contractor (with deductions as may be necessary for uncompleted work, if any). Claims under the contract is however different from claims under other sources such as statutory provisions.

Also, in some cases, where the parties so negotiate, a similar exclusion on making claims may be imposed on the Employer. This, however, is indeed an extreme end. The rationale for this limitation is that, by that time, the Contractor will have had time to sufficiently calculate any entitlement to which he claims to be entitled and to give notice of such a claim, and for the Engineer to deal with all such claims under the Contract. Parties sometimes enter into a reciprocal agreement accepting each other that they have no claims of whatsoever nature and the contract has been duly completed.

9.27 Summary

A common belief is that time extension (EOT) provisions are for the benefit of the Contractor and liquidated damages (LD) for the benefit of the Employer. However, this belief is not only wrong but promotes the reverse of true intentions.

Claims on global nature can be denied upfront wherever it finds the causes of delay attributable on the part of the Contractor, particularly where there is an exculpatory clause. Where the defendant was not liable for all the causes, it can be followed that there was a need to apportion delay between specific events but which was precluded, by the format of the global claim, with effect that the claim must fail. Finally and most importantly, the Engineer may return claim submissions once they are found to be rolled-up with fake information and those not justified with contemporary records in support. In nutshell, each issue has to be evaluated on its own merit.

It is always the Contractor to justify his basis and quantum with the contemporary records in support so that the Consultant shall evaluate the issues and establish his verified final opinion on the net resultant impact on the scheduled completion in line with the contract principles after taking all the circumstances into detail consideration.

CHAPTER 10
VARIATIONS

10.1 Introduction

Without an express provision allowing alterations to be made during the course of the contract, the Contractor cannot be compelled, for example, to perform additional works and the Employer cannot, without being in breach of the contract, omit any works that have been agreed. Variation clauses introduce much needed flexibility into somewhat rigid rules that otherwise govern the parties' obligations arising under construction contracts.

Although variations have long been recognized as a major source of conflict, variations are a route of procurement. Amongst the purposes served by change clauses is the flexibility by giving the Employer a unilateral right to order changes in the work so as to accommodate changes in his own requirements. However, in some contracts, the Engineer's extent of authority to issue variations has been kept open for any purpose, other than necessary for completion. Though it seems an 'open warrant' for the Engineer to unveil his desires in the best interests of the project, there are associated cost and time implications where the Engineer can not simply quit.

10.2 Variations defined

A variation is a change in form, character, kind, quality, quantity, line, level, position, alignment, or dimension of existing work or any additional work that the Engineer finds necessary, appropriate or desirable to complete works. A variation instruction does not automatically entitle the Contractor to additional payment, but once it is validly given, the

Contractor is under an obligation to perform it. For example, a common issue in infrastructure projects such as roads, drainage or water mains is that whenever some works have been executed outside the original limit of work as shown in the tender drawings, the Contractors tend to argue that it is a varied work by definition and therefore the new rates are applicable. Although ‘a change in line’ is defined as a variation, it does not itself render the existing bill rates inapplicable. The existing bill rates may be applicable even beyond the limits, other than locations far away, where the Contractor has to change his method of execution or his resource allocations.

A valid Engineer’s variation instruction must therefore meet the basic requirements; it must be in writing or verbally and subsequently confirmed in writing within a reasonable time frame unless otherwise expressly provided; be in respect of the form, quality or quantity of the works or any part of the works; and in the Engineer’s opinion, be necessary or be otherwise appropriate.

A variation clause does not merely entitle the Engineer to make large scale or significant changes to the nature and scope of work. A variation that is fundamentally changing the original scope, nature, type or complexity of work contemplated by the parties at the tender affects the validity of a contract. The Engineer should not introduce work outside the domain of the original job, which would cause hardship to the Contractor in terms of finance and technicality. The criteria to evaluate whether a change is a variation could be the cost of work, scope of work, technical inputs required, etc. In nutshell, the Engineer may make any variation not in the contract but within the reservations under the contract.

10.3 Value engineering

As a principle, no variation to the contract can be made by the Contractor. This does not however restrict the Contractor to submit value engineering proposals which in the Contractor’s opinion will if adopted accelerate completion, reduce cost to the Employer in executing, maintaining and operating works, improve efficiency, enhance value of the completed work, or otherwise be of benefit to the Employer. Value engineering (VE), as it denotes, is a systematic method to enhance the 'value' of products, services or operations through engineering measures. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. It is a primary tenet of value engineering that basic functions will not be compromised in the pursuit of value enhancement.

Value engineering therefore allows the Contractor to suggest alternatives or substitutes to materials, equipment, or even in designs and construction processes that save time and money in long-term maintenance. More importantly, value engineering overcomes paradigm blindness; instead it opens all in line to new methods, ideas and tools to improve their effectiveness. It helps crack through resistance to change by demonstrating other methods of site operations than the one currently employed, and demonstrating that they work, because they are being used by others.

For example, in construction of a major highway across mountains on re-measure basis, the cost consultant was struggling with the budget management due to far excessive materials declared unsuitable for embankment. The Contractor was in a dilemma how fast the completion could be achieved, apart from this windfall. The cost consultant in the question revisited the specification and came out with a value engineering proposal of rock fill (a mix of crushed boulders and class 1 soil compacted at close intervals). The question of slow progress was framed out technically in order to absorb this in-situ mechanical process so as to expedite the progress. When the specification was revisited for performance criteria as to compaction, an uncertainty arose as to whether compaction can be achieved at the crest of the embankment. This required the original question to be further reframed to ask whether a structurally sound embankment could be built with dry rock fill dam. Further investigations revealed that it is technically viable and as such the Engineer relaxed the specification in order to meet the basic performance criteria, making a huge saving on the contract. All cost elements of the entire proposal have been evaluated under variation provision.

In a road project where a line of utilities has been found to be running in parallel within the limit of work, the Contractor has been claiming a period of four months to de-route the existing line on the other side of the road. The total de-routing will take more than four kilometres until it reaches the next roundabout and take the return line to the opposite position of the original location. An additional cost has been estimated in the region of 150 k $, which is more than 30% of the total job value in connection with the utilities. As a result of value engineering effort made by the Engineer, a technical proposal was placed before the Contractor for their review.

It was decided to craft a tunnel across the existing motorway so that the traffic delays and costly restorations caused by open-cut construction can be avoided. Of three proposals, pipe ramming is a versatile technology for trenchless installation of steel casings in adverse soil conditions. Because there's usually a minimal need or no need for backstops, there is more flexibility working in confined spaces. With regular pipe ramming, air pressure can be customarily used to expel the spoils inside the casing. The second proposal was to carry out auger boring where water and mud removed from the ground are separated, decreasing the level of environmental contamination. This is also a trenchless method of constructing new sewer and water pipe without requiring man-entry, typically used for pipes ranging from 18-inches to 54-inches in diameter and 40- to 50-feet in depth. Micro tunnelling was the third option quite safer because the whole process is laser-guided and still there is minimal disruption to surface activities. Micro tunnelling is particularly effective in below-groundwater conditions, unconsolidated soils and where above- and below-ground obstructions exist.

The Contractor having evaluated all the technicalities together with the Engineer suggested having the micro tunnelling being the most economical and technically feasible alternative that brings cost and time down to a minimal. The Engineer issued a variation order under circumstances. As such, a very important function of a variation clause is to allow the Contractor to come up with proposals; be it called value engineering or any other name, if they are demonstrably in the best interests of the works.

10.4 Without written authorization

There is no 'authority' whatsoever for the Contractor to vary anything except in the execution of urgent remedial works. In other words, the Engineer sanctions unauthorized variations. A variation order is not generally required simply to firm up approximate quantities. Although certain standard forms state that a variation order is not necessary merely to correct the actual quantities, the internal procedures of many government agencies do not allow payments on increased quantities without a variation order. After all, the Employer needs to be sure that he has sufficient funds in the budget to complete the works.

It is often stated that the Engineer can give oral instructions and the Contractor should confirm the recognition of such instruction in writing within 7 days to the Engineer. If such confirmation is not contradicted by the Engineer within 14 days, such instruction is deemed to be a formal instruction of the Engineer. It is also deemed that on receipt of the Engineer's confirmation of instructions in respect of any variation, the Contractor shall immediately proceed to carry out such instructions. The work shall not, without the consent of the Engineer, be delayed by the Contractor pending finalization of the rates of the variation.

In case a Contractor may perform additional work for an Employer without first adhering to notice and approval requirements of the contract, it might turn to be unhealthy at a later stage. Failure to obtain authorization for additional work from the Employer's designated representative may, and often does, bar entitlement to be paid for the extra work.

10.5 Mode of instructions

Some contracts are very specific about the requirement for instructions to be in writing. An instruction issued by the Engineer in writing, regardless of whether it is on official instruction form, a non-standard form, a letter or a log book note fulfils the contractual requirement in writing. If the Engineer gives an instruction other than in writing it can become effective by the procedure where the Engineer subsequently confirms instruction in writing or the Contractor confirms the instruction in writing and the Engineer does not dissent it in writing of receipt of the Contractor's confirmation. Usually the compliance within the time frame stipulated in the above steps is basically a reciprocal obligation.

If an instruction only becomes effective in this way, the Contractor can not rely upon compliance with an instruction issued otherwise than in writing. Subject to procedural rules, an instruction given orally by the Engineer is deemed to be an instruction to comply with, and is not a matter to delay action.

However, there are contracts that provide for the issuing of instructions by the Employer's agent where a contract instruction is defined as 'a written instruction signed and issued by or under the authority of the Employer's agent to the Contractor'. Some contracts provide that 'an oral instruction issued by the Employer's agent or any other agent shall be of no force of effect. Neither the Contractor nor the Employer may rely upon an oral instruction for any purpose'.

10.6 Delay in verbal order confirmation

A Contractor in one unrecorded case argued that three copies of operation and maintenance manuals were submitted as per the specification on 27 January 2010, well before the issue of the certificate of completion dated 23 February 2010 so that he met one final contractual obligation, must be paid as per the contract, and subsequent deletion from the contract scope is therefore not contractual. The supervision consultant acting in capacity of the Engineer's representative denying the Contractor's allegation contends that the Contractor has been verbally given orders that these particular manuals are no longer required on technical grounds for the dry leg gravity system so that the item for the bill of quantities shall be omitted from the contract scope. The Contractor argues in turn that it is an arbitrary attempt to make savings on the contract by picking up items here and there in the bill of quantities.

However, the issue may also revolve around the Engineer's technical judgment as to why the Contractor proceeded with this item if it was not envisaged in the dry leg gravity system. Although there was no written confirmation for the verbal order to delete the subject item, it was contended by the Employer that the verbal instruction on 27 January 2010 is genuinely preventing the second submission on 12 April 2010 unnecessarily undertaken by the Contractor. Only the cost on first submission can therefore be payable under circumstances. All the other arguments are not sufficient enough to dispel the Contractor's allegations. However, the danger behind the considerable delay in confirmation in writing, as much as 3 months or so, might turn defensive, since the period itself is unreasonable, and nothing can be proven.

It was finally held that it would have been a valid omission from the contract (even in the lump sum modality applicable to this contract) if it was communicated in writing to the Contractor well before the Contractor committed his resources in execution of the said item.

10.7 Devil's in the details

Often the Contractors and even consultants perform additional works or services for their Employers pending notice and approval requirements of the contract. However, any failure to obtain authorization for additional work from the Employer's designated representative can, and often does, bar entitlement to be paid for the extra work. The theory that poses is when the contract states it can only be modified in writing, it means what it says. Courts enforce these provisions even in situations where the results might appear to be 'unfair' and the Employer might appear to receive a windfall by not having to pay for work. Equally, if a consultant is asked by an Employer to perform services that it deems are 'additional services' beyond the scope of the 'basic services' for which it was to compensate, it must adhere to the requirements of the contract to provide the Employer with written notice that the services are 'additional'. It will also have to meet any contractual requirements mandating that the notice be given to a specified representative of the Employer for approval. Finally, it will have to adhere to every one of contractual requirements concerning the documentation of costs associated with the additional services, despite the rapport with the Employer being a pay master and a potential source of future jobs, altogether led to informality and apparent waiver of contract requirements.

Although the Employers generally do not intentionally pause the consultants and Contractors into performing services with the intent not to pay for them, what sometimes happens is that when the Contractor or consultant submits claims to the Employer at the end of the project, the Employer retains counsel who determines that the parties did not adhere to the notice and documentation requirements. In fulfilling their zealous representation to the Employer, they advise the Employer that because these requirements were not met, the claimants have legally waived their right to be paid for the additional work. There are even reported court cases in which the Employer counter-claimed against the plaintiff and recovered progress payments it had made on the work that had been performed without written authorization of the designated Employer's representative.

10.8 Engineer's role in varied works

The Engineer ought to obtain authority to issue variation orders which result in the expenditure of beyond a specified net value of contingency. Any variation order in excess of such a percentage or amount requires the Employer's approval prior to its issue. In case the Engineer issues a variation order beyond the limits imposed by contract, such order could be challenged by the Contractor or even by the Employer, depending on the implications. Also in the meantime, the Engineer shall convey notice to the Contractor of his intention to vary a rate and fix suitable rates for varied work when ever a bill rate is no longer applicable. Here, the Engineer's duty is to check the basis of Contractor's submission and evaluation of variations (whether on existing bill rates, rates on pro-rata basis, star rates, day work rates etc) albeit the function falls within the purview of quantity surveying. In absence of contemporary records to support evaluation, the Engineer shall make his own assessment based on information available to him as reasonable and proper having regard to the circumstances and notify the Contractor new rates derived or agreed with a copy to the Employer while ascertaining the effective contract sum for net effect of all variation orders. Valuation of the net effect on the contract is also important so as to compensate the

Contractor for any under absorbed overheads due to overwhelming amount of varied works.

The Engineer shall confirm verbal order before or after carrying out variation unless such verbal order is deemed to be an order in writing and contradict the Contractor confirmed verbal order if necessary unless such confirmation becomes a variation order. Anticipated variations and their likely financial and schedule repercussions including overhead for omitted works is by and large a function in the management of variations.

10.9 Obligation to fairly evaluate varied works

Almost every standard form has a clause vesting some powers on the Engineer to form an opinion as to suitability, applicability and the limit of a rate increment. The Engineer shall determine these elements based on the nature and amount of the subject omission or addition against the nature and amount of whole of works. Broadly speaking, any varied work shall be priced in accordance with the rates and prices in the contract, but if those are not applicable, the Engineer shall agree rates and prices with the Contractor. If no agreement is possible, the Engineer has the power to fix what he considers fair and applicable. When the Engineer unilaterally fixes a rate for a new work without giving the Contractor an opportunity to negotiate, it may deem economic duress.

Because the valuation of varied work can be fertile ground for argument, if a Contractor disagrees with the Engineer's determination on rates and prices, he can still refer the issue to the Engineer once again prior to invoke the dispute resolution procedure. This can be considered as an extra contractual opportunity available for the parties to avoid a probable dispute. It will be an unfair deal when the Engineer unilaterally fixes a rate for new work without giving the Contractor a chance to revisit his position. But the Courts will interfere in agreements procured by the exertion of economic duress by one party over the other, if there is compulsion on, or a lack of practical choice to agree into a fair rate. The premise is that if the nature and scope of omission renders the existing rates no longer appropriate, the Engineer should use his authority in good faith in order to adjust it to an appropriate extent in such a way that the Contractor obtains a reasonable profit. The parties therefore need a considerable knowledge and exposure on methods of construction, estimating, programming etc in computing a realistic value for variations. Most importantly, the records intact play a significant role in the review of variations.

10.10 Validity of omitted work

Omissions are in two distinct categories, namely arbitrary deletions under a contract and missing items unknown in the preparation of a contract. Both the works deleted from the original scope of work and omissions coupled with the term errors are taken and valued under variation clause. The scope for the latter would include any departures from the method of measurement, any error in the description of work, any error in the quantity of work, omission of items required by the standard method of measurement, etc. Such errors and omissions shall be corrected and treated as if it were a variation ordered by the Engineer under the variation clause. It would generally be a fair adjustment in the existing unit rates or lump sums in order to reflect the corrected quantity or description. However in some contracts, errors and omissions are treated under the provision of ambiguities and discrepancies, where the Engineer is given a wide mandate to decide on their application and the quantum of loss sustained as a result. The Contractor shall then recover costs, with profit in relation to additions to the permanent or temporary works (including those of the items of preliminary nature) in respect of such instructions. As deemed reasonable, the Engineer is also required by time extension provision to take such matters into account in assessing any extension to the completion date.

If a variation omitting works is invalid then such is a breach of contract entitling the Contractor to damages. Where the works have been omitted and given to others to carry out, it is clearly established a breach of contract and not a valid variation at all. It could be a claimable issue if the Employer himself or another Contractor carries out any omitted work without consent of the Contractor whilst a contract exists. A reservation would be when it can be proved that the Contractor is technically or financially incapable of carrying out such omitted work. However in some contracts, the Employer has the right to omit a part of the scope and get it done by another Contractor under a separate contract. Who should share the benefit of a valid omission is a question of interest, despite the appointment of another Contractor. If the nature and scope of omission renders the existing rates no longer appropriate, the Engineer has the power to adjust it to an appropriate extent and in a substantial omission; the Contractor may well be having a right for loss of profit.

The power to vary works does not allow the Employer to deprive the Contractor of entertaining the benefit of that work altogether. This rule was established in an Australian case[48] where a clause in the contract allowed that; if sufficient topsoil to meet the requirements of the works can not be obtained within the right of way, the Engineer may direct the Contractor in writing to obtain top soil from other approved locations. The contract also contained a clause allowing the Engineer to omit any of the works. The Engineer, instead allowing the Contractor to obtain the required topsoil from other approved sources, decided to omit the works from the Contractor and awarded the same to another Contractor at a cheaper rate. The high Court of Australia held that the clause only gave the Engineer the choice between directing the Contractor to obtain topsoil or to omit the works. It did not confer the Engineer to have the works executed by another party. Stephen J made the point that such an omission is an invalid omission.

Deletion of a substantial volume of work may also be an invalid variation. In the case of *Chadmax v Hansen*[49], the sub Contractor was engaged to install wall paper to stairwells and corridors. The architect subsequently deleted a substantial volume of work from the main contract and the main Contractor did likewise with the sub Contractor. The sub Contractor sued the main Contractor for the repudiation of the contract. It was held that the allowing the defendant to require increases or decreases from the sub contract works could not be construed as a power to cancel virtually the whole of the sub contract work.

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[48] Commissioner of Main Roads **v** Reid [1974] 131 CLR

[49] Chadmax v Hansen & Yunken Pty Ltd (1985) BCL 52

In the case of *Gallagher v. Hirsch NY*[50], the Court held that the word 'omission' meant only work not to be done at all, not work to be taken from the Contractor and given to another to do. Secondly, where the power to order variations set out in the contract has been misused whenever the conditions of contract state that a variation must be either necessary or desirable for the satisfactory completion or functioning of the works. Works can not be omitted for example, to save time for completing the works, or to purposely save the Employer's money.

10.11 Loss of profit on omitted works

Whenever variations are ordered that omit work, and particularly if such omissions are substantial in nature, Contractors often argue that they should be entitled to claim loss of profit that they would otherwise have earned on such works.

If, however an instruction omitting works is a valid variation, then whether a Contractor can claim loss of profit on such omitted works depends upon the wording of the contract. Many standard forms provide that the prices in the contract bills shall determine the valuation of items omitted; save that if omissions substantially vary the conditions under which any remaining items of works are carried out. This provision is not accommodating in a claim for loss of profit, because it provides that the omitted works must be valued at the rates in the contract bills, i.e. omitting the full value, including profit, of the item in the contract bills. Also the variation must substantially vary the conditions under which the remaining items are carried out before the remaining items can be re-valued.

Usually, the loss of profit on an omitted item will not in itself vary the conditions in which the remaining items are carried out. However, contracts typically provide the Contractor with an entitlement to claim 'direct loss and/or expense' incurred by reason of a variation. In the case of *Wraight Ltd v. P H and T Holdings*[51], a contract was wrongly determined with the work partly completed. The determination clause provided for the Contractor to be paid 'any direct loss and/or damage caused to the Contractor by the determination'. It was held that this wording included loss of gross profit on the uncompleted work. A claim for loss of profit on works omitted by way of a variation can be claimed as direct loss and expense, therefore.

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[50] Gallagher v. Hirsch NY App Division 467 (1899)

[51] Wraight Limited -v- PH & T (Holdings) Limited (1968) 13 BLR 29

Many standard forms provide for re-rating other items in the bills of quantities if a variation renders such rates inapplicable or unreasonable. However it is again not considered possible to argue that this power extends to re-rate other items in the bills of quantities on the basis that there has been a loss of profit on works omitted. Although a variation omitting works would not normally cause a disturbance to progress, the Engineer has to take a holistic view prior to judge on the recovery of losses incurred by the reason of omitted works.

Generally, for Contractors seeking to prove a claim of lost profit due to omitted scope, it is crucial to demonstrate that his loss of profit by the omission of work is genuinely incurred because his inability to recover that loss elsewhere. It is not sufficient to simply argue that the lost profit is speculative on the basis of a profit allowance in tender, i.e. loss of profit = value of omitted work x 15% profit margin for instance. On the other hand, importing case law from different jurisdictions will definitely have legal ramifications. It could also be argued that the parties have entered into contract clauses together with their repercussions taken to have already agreed unless the contract expressly forbids or provides for. Whether the Employer generally has the absolute immunity against any claim for loss and profit due to omitted work entirely depends on how it is worded in the contract.

Another case is related to dewatering which is an existing B/Q item, quoted as a lump sum, but not prevailed at site. Hence, the Contractor was invited to sign the original copy of the site instruction as a formality to omit dewatering from the scope of work. The Contractor regretting signing the site instruction argued that dewatering is an integral part of excavation that cannot be separated from excavation item and hence, the contract sum can not be adjusted. He further added that he did not receive soil report at the time it was priced.

Notwithstanding the extent of availability of information related to tidal movements, type of soil, water table etc or the pricing strategy adopted in the tender, the entire obligation falls on the Contractor to make his own interpretation as to the nature and extent of work involved in both temporary and permanent works. Such a technical judgment is a sole prerogative of the Contractor for which the Employer is not liable under whatsoever circumstances except in cases where the Contractor is able to justify that the Employer is at default, such as failure to provide accurate information timely whenever expressly provided for in the contract.

The Engineer found no such record of request or qualification during the tender. The Contractor has neither made any provision in his clause 14 program nor in the methods statement as to how he intends to deal with the issue of dewatering. The section B for preliminaries in which the tenderer has an opportunity to identify the items not priced elsewhere in the B/Q also had a zero value. Nothing has been executed physically later at site with regard to control of ground water such as installation of standpipes and other devices as specified, altogether revealing lack of compliance/emphasis on the subject issue at the time of tender.

Nonetheless, the Contractor shall be deemed to have satisfied himself before tendering as to correctness and adequacy of the tender for the works, bearing in mind that pricing risks are inherent in any typical lump sum fixed price contract. As such, the tender sum shall be comprehensive enough to cover up all obligations under the contract as specified in drawings, B/Q and specifications etc. Without prejudice to the primary intention of the contract, the Engineer reserves the right to vary the works. The distinction is made in clause 55 in this particular contract, where any error or omission from the bill of quantities shall provide no grounds for adjusting the contract price. In contrary, omission of an existing B/Q item is defined as a variation and thereby provides grounds for adjusting the contract price. This deletion is thus contractually valid and the power to do so has been vested in the Engineer.

Further, the Contractor's price against each bill item shall truly reflect the value of the item described as noted in pricing preamble.

Any individual B/Q item that is itemized and separately measurable or payable, apart from other pay items operationally or otherwise integral, incidental or associated with it can be assessed in full at the existing contract rate/s according to its occurrence. The dewatering in this particular instance is an independent bill item of that category that did not prevail at site at all, so is apparently a subsequent variation under the contract by a complete omission, the benefit of which shall be retained by the Employer. Under circumstances, the Engineer found no valid technical or contractual basis to justify why the Employer is liable for payment for dewatering.

10.12 Works omitted and added back in another contract

Occasionally, the Employer might decide on technical grounds or otherwise to omit a single bill item or a group of bill items from the contract and add the same onto another contract operating concurrently on site. This scenario brings several issues.

a. Whether the Employer reserves the right to omit a part of scope when such works are necessary for completion.
b. Whether the Employer reserves the right to omit a part of scope and add it onto another Contractor as a variation
c. If the Employer reserves such a right, then how to adjust individual contract sums.

The Engineer can issue instructions to omit works under variation provision irrespective of whether they are necessary or desirable for completion. This is Employer's prerogative but implications are there. Some contracts expressly provide that the Employer reserves the right to omit any part of scope for any purpose, wildly leaving the Contractor for no choice.

Whenever the scope of omission, be it a single individual bill item or a group of items, has been substantial, the Contractor may well be having a claim for loss of profit. This is elementary economics where the parties in serious business naturally expect profits. The concept of loss eventually includes loss of profit as confirmed in case law.

However, many standard forms of contract do not permit the Employer to take aside a portion of work from the contract scope and employ another Contractor to do the same. This is against the doctrine of good faith and fair dealing. There are statutory provisions also that bar the Employer in adjusting their scope of work for undue commercial gains. To be more precise, an Employer can not negotiate with another Contractor for a work scope that already exists in the ongoing contract, for a lower price. This is not allowed under the doctrine of unjust enrichment.

However there may be cases when the existing Contractor has been no longer capable of carrying out a certain scope of work. The Employer has no option but the remaining works to be done by another Contractor. Being technically exhaustive, commercially bankrupt, or persistently in slow progress, the Employer has several options one of which is to invoke the variation clause and omit the subject scope from the existing contract and refer to another Contractor. The Employer's loss in this initiative is recoverable from the failing Contractor as a debt due from monies payable to him. The components of this loss range from direct losses such as costs on re-tendering, price difference, consequential losses etc to far remote economic losses such as loss of business opportunities, lost income due to delay in occupancy or in taking over the completed building.

A contract has the following bill item against a provisional quantity imposed by the Employer. A hypothetical example is 2 hour rated fire doors 100 Nos at the rate of $10 amounting to $1000.

The Employer just omits this item for no good reason. The deleted amount is $1000 only. The Contractor may claim a loss of 25% profit. The Employer denies on the ground that the loss is not substantial or the contract has no express provision to reimburse or it is the Contractor's on board pricing risk.

Subsequently, the Employer negotiates with another Contractor a fresh price lower than the existing rate. It is 2 hour rated fire doors 100 Nos per $8 amounting to $800. The Employer gets a saving of 200 which is an undeserved amount. Assume the quantity increased by 120 Nos so that the Employer's payment in each contract would be as follows;

Old Contractor	- 2 hour rated fire doors	120	10	$1200
New Contractor	- 2 hour rated fire doors	120	8	$ 960

The old Contractor may definitely claim loss of profit. The Employer has to reimburse the loss of the old Contractor while the actual cost to the new Contractor.

Assume the scenario is not so positive where the Employer finds a valid technical reason to omit the scope and give it to another Contractor at a higher price as follows;

Old Contractor	- 2 hour rated fir doors	120	10	$1200
New Contractor	- 2 hour rated fir doors	120	15	$1800

The Employer loses 600 upfront. This gap is recoverable from the old Contractor.

In all cases, the quantities are re-measurable since they are provisional. Quantities are not reconcilable (in between provisional quantity and actual quantity). Neither the rates are interchangeable in adjusting their contract sums. The Employer has no right to reconcile his losses using rates of one contract over another. This is in accordance with the doctrine of privity of contract. Each contract is autonomous and evaluated in its own merit. The loss lies where it falls.

10.13 Variations exceeding 20%

The whole idea of 'variations exceeding 20% clause' (sometimes this is 10% or 15%) is to compensate the Contractor for any unabsorbed overhead component due to awesome decrease or increase of such work where his overhead would have been expended more and his profit would have been exhausted more in proportion to what he had planned and contracted with, and vice versa for the Employer. In the meantime, parties tend to misunderstand by virtue of the said clause that the Contractors are authorized to claim new rates once the value of work done has been exceeded by 20% of the contract sum. The first hand impression is that the Employer has the right to increase or decrease work, up to 20% of the contract sum, but not beyond.

However, the Employer's right to issue variations up to the limit of 20% original contract sum (as in some contracts) is totally different from the variations exceeding 20% for the compensation of unabsorbed overhead due to adjustment of quantities and varied work. The first limit could be during the progress of work while the second only at the practical completion. The first explains the Employer's right while the second deals with the Contractor's entitlement.

Another aspect is when the quantity of an individual pay item has been found to be exceeded by a certain limit, not necessarily 20%. The clause 51 in many standard forms provides Engineer to form his opinion as to suitability of the existing rate and decide a new rate in a disagreement. This individual treatment is allowed in the contract depending on the nature and amount of such varied work, which is not the subject coverage under variations exceeding 20%.

Under circumstances, it is not reasonably inferable that the Contractor has the right to refuse any variations beyond this limit, except of course in two circumstances where the instructed new work falls out of the contract domain because the additional work were so peculiar, so unexpected and so different from what was contemplated by the contract and in any additional work found to be unnecessary for completion that does not fall under variation clause.

An anomaly of this ruling is the ignorance when some works omitted at the last lap of the project so that the net resultant impact is not necessarily exceeding 20% but still the Contractor may have a case validly submitted under the grounds of this provision. The variation clause on the other hand does not specify a limit in the contract for the Contractor to stop work or object compliance with the instructions to variations.

A rate revision can be made only on the circumstances that rendered the existing rates unreasonable or inapplicable (due to nature and amount of any omission and addition compared with the nature and amount of whole of the contract work or to any part thereof). A rate would even be reduced perhaps in a typical civil engineering work where the rates could be much more profitable owing to economies of scale whenever the quantities are overwhelmingly increased. A rate revision is possible only when the net resultant impact of variations is in excess of +/- 20% of the effective contract sum.

However, in some contracts, the ruling of preliminary adjustment (instead of this 'variations exceeding' provision) can be seen apparently because of the belief that preliminaries are basically site overheads and they have been affected because of varied works, and such effect is linearly proportionate with the time related activities. The reality would be far different to that thinking, for instance, the level of maintenance of site facilities might remain the same despite of however much the varied works come into effect at site, unless of course in a cardinal change. To cover up the anomaly of this ruling in operation, the Contractors have been asked to submit invoices to prove actual costs incurred. The glaring anomaly behind this second ruling once again is that varied works percentage (cut off limit, say 20%) can at any time change during the currency of the contract, making the whole mechanism invalid.

10.14 Net impact of variations

Generally, the additional or omitted works shall be valued at the rates set out in the contract. If the contract does not contain a rate applicable, then a suitable rate will be agreed. The Engineer shall fix such rates in a disagreement. The grounds on which the existing bill rates can be revised are copious and therefore the general theme of adjustment is that "if the nature or amount of any omission or addition relative to the nature and amount of the whole of the works shall be such that the existing rates in the contract are no longer reasonable or applicable". Many standard forms follow this principle.

Basically there can be two common scenarios. Firstly, the quantity of an individual bill item exceeds substantially. There is no cut off limit such as 20% stipulated and sometimes, it may render the existing rate unreasonable on technical or economic reasons so that the Engineer reserves the right to revisit the rate and adjust it to make it reasonable. Of course, the Contractor may look for a rate revision.

Secondly, the net impact of variations (after additions and omissions) on the effective contract sum (original contract sum excluding contingency, prime and provisional sums, day works, sums adjusted on price escalation any other fixed sums in the bill of quantities) has been exceeded by a certain percentage. There will be a point where the Contractor has incurred more overheads than anticipated due to the irresistible amount of variations. The cut off limit for that could be 15% as in FIDIC 1987 for instance, calculated at the issue of taking over certificate for the whole of the works. This is simply because till the taking over, the parties may not be able to ascertain the net impact (as there can be a considerable omission at the last moment). However, the parties may decide the appropriate time of assessment, usually when the project is nearing completion, so that they are in a position to see in advance any anticipated variation.

In the second scenario, the contract price shall be adjusted by a lump sum figure, a total rate revision or using new rates for selected varied work having regard to the Contractor's site and general overhead costs of the contract. Such sum shall be based only on the amount by which such additions or deductions shall be in excess of say 15 per cent of the effective contract price, meaning that there will be no adjustment to the contract price up until the net impact runs over the line of 15% either way, plus or minus. The whole idea is to compensate the Contractor on under absorbed overheads due to overwhelming amount of varied works, the net resultant effect of which is either addition or omission when compared with the original work volume.

The formula is simple as;

$$\frac{\text{NRIV}}{\text{ECS}} \text{ X } 100$$

Where NRIV is net resultant impact of variations due to quantity changes, additional works and omitted works, and the ECS is the effective contract sum which is the sum after taking aside the contingencies, prime costs, provisional sums, day works and other adjusted and fixed sums from the original contract sum (Appendix B provides an example).

10.15 Reconciling quantities

Whenever the Employer intends to delete a particular item from the scope of the Contractor (assuming a lump sum contract allows for it), the Contractor may argue that the Employer can delete only the quantity as per the tender drawings instead of B/Q quantity since the Tender drawing quantity is lesser than the B/Q quantity. Which one is contractually correct? If there is nothing stated in the preamble to the B/Q, if the total quantity is being removed, then it would be on the basis of B/Q quantity x B/Q rate, the logic being that the Contractor checked the quantities, realized that the quantity was inaccurate and made the necessary adjustments to the unit rate. Of course, the Contractor could have a claim for loss of profit and overhead recovery, if there are no compensating additions.

Assuming the Contractor has priced in the B/Q for ceiling finishes comprising of ceiling plastering and gypsum ceiling. The Employer wants to delete the ceiling plastering (the quantity is more in the B/Q, than the contract drawings) and wants to retain the gypsum ceiling (the quantity is lesser in the B/Q, than the contract drawings). Now if both quantities are compared together the total area of ceiling plastering and gypsum ceiling, the difference is very close to the area as per the tender drawings. Contractor is arguing that he has allowed for the ceiling works as a whole and his cost is allocated in the total ceiling work costing and therefore cannot delete the entire quantity of ceiling plastering. Is he correct in this argument? For the gypsum ceiling the material is to be provided by the Employer. The rate for both ceiling plastering and gypsum ceiling is almost the same.

Presumably the value of the payment will be increased in the ratio of the increased area. It depends on the exact ratios between prices and areas for the two different ceilings. It is unreasonable to expect the Contractor to do a larger area for the same money as originally envisaged. Hence, a calculation must be made to see if the Contractor is in loss or profit. If he is loss, then he has the right claim for loss of profit and overhead recovery.

10.16 When civil works increase

Economies of scale is cost related which refers to the decreased per unit cost as the output increases. More clearly, the initial investment of capital is diffused over an increasing number of units of output, and therefore, the marginal cost of producing a good or service decreases as the production increases subject to a limit, beyond which it results what is called 'diseconomies of scale'.

Any fixed costs of production are initially increasing but with the economies of scale it is diminishing as the production goes up. Traditional mass production is therefore built on this concept by means of a high volume standardized product with few options. If the cost of production is represented in a cost function (C), depending on the amount of product or service produced (Q), an economy of scale can be mathematically expressed as; $C(Q1+Q2,0) < C(Q1,0) + C(Q2,0)$.

In economies of scale, multiple products can be produced at a lower cost in combination than they can separately. This enables rapid low-cost switching from one product line to another, which is possible via flexible manufacturing systems. Economies of scale occur in industries with high capital costs in which the increased costs can be distributed across a large number of units of production. An investment in machinery is made and one worker begins to work on the machine and produces a certain number of goods. If another worker is added to the machine, he or she is able to produce an additional amount of goods without adding significantly to the line of operation. The amount of goods produced grows significantly faster than the plant's cost of production. Hence, the total cost of producing an additional good is less than the good before it, and an economy of scale emerges.

On the same token, in large civil engineering projects, basically plants intensive operations such as mass excavations in borrow pits for dams and river valley conservation, dredging works in water lodgement projects, wet blanketing using soil to seal cracks in water reservoirs, etc can reduce the basic cost as the work volume increases. However there is a point of volume at which diseconomies of scale starts.

10.17 If quantities are over measured?

Consider for example, that an item did not appear at all in the B/Q but in the specification, the Employer would expect the Contractor to execute at no extra cost, strictly by virtue of lump sum contract. Similarly, if the Employer (or his consultant) allowed more items in the B/Q, the Contractor's obligation is only to execute the number of items shown in the drawings and therefore no omission can be instructed because of the quantities mistakenly inserted in the Contract. However it all depends on the way the contract has been expressly provided for. For instance, the clause titled "Quantities" in many standard forms specifies that the quantities set out in the bill of quantities are to be taken to be the actual and correct and any error in or omission from the bill of quantities shall not invalidate the contract nor be grounds for adjusting the contract sum. This clause does not restrict the Engineer's capacity to omit works and value under the clause "variations" whereas any missing items in the bill of quantities are still taken to be the valid scope of work that does not require any re-measurement or adjustment in the contract sum. Errors in quantities are taken to be the risk of both parties.

In a typical lump sum contract, any mistakes in the bill descriptions, quantities or extensions are unlikely to be remedied as a legal rectification of the terms of the contract to reflect the true intention of the parties. It is more likely than not, that the common intention will be the tendered price should prevail, rather than a price revised to account of the error. Any error whether of arithmetic or not in the computation of the contract sum shall be deemed to have been accepted by the parties and the 'total lump sum contract price' agreed by the parties stated in the contract agreement shall remain unchanged except in the circumstances allowed under the contract such as in variations, in wage rate changes as a government directive etc.

In a case, the design of the entire scope of work related to surface water drainage system had been fundamentally changed from open trenching to micro tunnelling. Micro tunnelling shall therefore be jointly re-measured based on the approved construction drawings, and valued as per B/Q rates or in absence of which the fair rates. Re-measurement is possible under clause 56(1) and valuation is possible under clause 50(2) in this particular contract. The relevant B/Q items shall then be deleted after above additions in the adjustment of contract value.

Again in another case, an 'engineered fill' was suggested in lieu of imported fill. Imported fill means the soil brought from designated borrow pits, capable of being readily introduced directly into the embankment and compacted to the required densities and profiles as specified in the contract. Fill with dune sand is what is aptly called 'engineered fill' that essentially requires in-situ mechanical process to meet the specification. Accordingly, the B/Q item for imported fill shall be omitted under variation clause and the item for 'engineered fill' shall be quantified and valued in an agreed 'fair' rate under the same provision. No B/Q quantities can be adjusted in compromising of another item in a strict lump sum contract. As such, the Contractor's argument to treat dune sand as 'imported fill' was considered to be unacceptable. In all three cases above, dewatering, surface water drainage and in imported fill, the Engineer could treat them separately as omitted from the contract sum, despite the label of lump sum, mainly because the items have been priced independently and their scope could be identifiable.

In another case, there was a bill item for grouting of cavities, the scope of which is identifiable only when the excavated surfaces have been exposed. Although it was a handful of cavities found in site, the Engineer could not reduce the quoted lump sum in the bill, because of the substantial reduction in the work scope assumed in the tender.

However, in another case, the increase of actual physical quantities has been so substantial (4,900m3 to 18,113m3) that tilts the apportionment of risk in pricing and prejudices a tender presumption (that the quantities given by the Employer in the bathymetric survey report on which the tenderer has relied in order to establish his tender price are correct). It was not the intent of the contract to conduct a separate survey to test the accuracy of the quantities provided by the Employer, other than the final survey by the Contractor in order to verify whether the correct depths have been achieved so as to ensure 100% coverage. Accordingly, the Contractor had a case to argue that this is a valid varied work, and his price for removal of silts has become obsolete. This is a classic case for re-measurement when data so derived in a survey upon completion can only be taken as the guideline to establish final quantities for the payment purposes (provided such survey is undertaken jointly on the supervision of the Engineer). It was suggested deriving a unit price, marginally low, taking the benefit of economies of scale, with the substantial quantity increase, omitting the lump sum amount.

In a recent case, the ducts for underground electrical cables at 600mm level shown in tender drawing No E-00 were not mistakenly measured in the B/Q. The revised construction drawing No SD-E00 superseded the scope of work envisaged in the tender drawing No E-00. This paved the way for adjusting the contract sum as a valid variation under the contract, which involved omission and addition of the scope shown the drawing No E-00 and SD-E00 respectively. The Contractor argued that omission from the bill of quantities is not possible in absence of a B/Q item. However, the logic is that the tender shall be comprehensive enough to cover up all the obligations under the contract as prescribed in the contract documents including drawings, irrespective of whether a particular item of work has been included or excluded in the bill of quantities unlike in a typical measure and pay contract. The Contractor shall also be deemed to have satisfied himself before tendering as to correctness and sufficiency of the tender for the works. Accordingly, the cost on PVC ducts shown in tender drawing is deemed to be priced within the tender.

Having subsequently altered the subject scope by the above revised drawing constituting a variation to the contract, the Engineer ascertained by ad-measurement the net resultant value of the respective work. All such works were valued at the rates set out in the contract in order to maintain the tender pricing level. As such, the deduction made for omission for which the price is already catered for was contractual.

10.18 Unrealistic rates

Generally, the Contractor is entitled to assume that the B/Q has been prepared in accordance with SMM and that the items and quantities found in the bill of quantities are reasonably accurate descriptions and estimates of the work shown on the drawings and described in the specification.

The risk of inaccuracies in bills in the first instance falls on the parties it uses. Any error or omission provides no grounds for adjusting the contract price strictly under lump sum contracts. Both the Employer and Contractor have therefore been exposed to a risk of error in quantities which will result in a windfall to a one party depending on how quantities would fall correct with the actual. This is in fact an anomaly in any lump sum contracts where the quantity risk exerted by a third man (consultant) has been taken up by both parties. However, in typical re-measure contracts, the story is fundamentally different because the quantities are estimated and subject to re-measurement including those of theoretical errors in the priced bill of quantities.

The Court of Appeal in the *Henry Boot* case[52] found in favour of the Contractor and emphasized the fact that bill rates, which contained an error, should not prevent them from being adopted in the additional work as well. In this case, it was an over pricing. If the Contractor put an unrealistically high rate, he is entitled to have the rate used for valuation of subsequent variation. When the Employer accepted the tender with the unrealistically high rate, it can be said that the Employer accepted the risk of that being used in valuing additional quantities also. The application of the contract rates can not be avoided simply because one party is dissatisfied with them. The contract rates are immutable, and not subject to correction.

There shall be no rectification of any error, omission or wrong estimate in the descriptions, rates and prices inserted by the Contractor. The effect of this principle is that a mistake in a rate is bound by the parties equally. The only situation where a contract rate may be departed from which it is not executed under similar conditions or when there is a substantial increase or decrease in quantities which render the existing rate unsuitable.

The matters to be taken into account when deciding whether conditions are similar are basically the physical site conditions such as wet compared with dry, confined space compared to ample working space, winter working compared to summer. When valuing variations, the works executed under similar conditions do not refer to economical or financial considerations. The question whether a rate is profitable or not is therefore irrelevant in application of this principle. The matters should be taken up when deciding whether work is of a similar character are the functions of materials, size and shape, vertical, horizontal and inclined, location, to name a few.

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[52] Henry Boot **v** Alstom Combined Cycles (2000) CTC

However in either of these operations the fact that a rate or price may be too high or too low is completely immaterial. A very high rate or a very low rate is not rendered unreasonable by a variation or a substantial change in quantities but is already unreasonable when the contract is entered into. Alternatively, the Contractor has included an unrealistically low rate in the bill of quantities; such rate could be applied to the extent of bill quantities and any excess in quantity over and above bill quantity may be paid at a fair rate.

10.19 Fair valuation principle

Bill of quantities amongst the other parts of the contract document describes the work that is to be carried out and establish a rate or price for the item of work. A bill therefore allows the final measure of work to be valued by simply multiplying the rate by the quantity of measured work. But in reality the original bill of quantities may be inaccurate either in the description of the work or in the estimate of quantities. A question is how far can the rates be applied in valuing the corrected measure? To what extent do the original rates apply and can they be used in valuing variations or does another approach works better?

The existing rates will be applied unaltered if the work is similar in character and executed under similar conditions as the work priced in the bill. If either the work is dissimilar in character or executed in dissimilar conditions, then the Engineer fixes a 'star' rate, by breaking down the quoted rates into the elements of plant, materials, labour and overheads and adjusting each element that is affected by the variation. This kind of adjustment seems sensible.

The Engineer has to fix a rate even if he does not have the Contractor's build-up. Instead he may use a notional build-up using any contemporary records submitted by the Contractor. It is still not clear when the star rate approach will not be appropriate, but it appears that only in exceptional situations will a fair valuation be made. As to what amounts to a fair valuation, it was held in the Henry Boot case that this meant one that does not give a Contractor more than his actual costs, reasonably and necessarily incurred, plus overheads and profit.

However, it is not clear from the decision how the profit and overheads are to be assessed; whether these are to be based on the Contractor's tender allowances, or whether the Contractor has to show some loss of profit or loss of contribution to his overheads. This approach applies not only to the varied work itself, but also to work affected by the variation. It is necessary first to show that the variation caused bill rates for other items of work to be rendered unreasonable or inapplicable. If so, then new rates can be fixed or fair valuation used where appropriate. Importantly, the decision in Henry Boot teach apart the effect of additional varied work on original measured work from the effect on other work. The re-rating appears to apply only to rates and prices in the original bill and not those fixed by the Engineer, in varied work for instance.

Which of the rules, i.e., existing rates, or fair rates, depends largely upon the timing of the variation order, the location of the work, the quantity involved and the circumstances in which the work is executed. If it can be established that these factors precluded the valuation on the basis of bill rates then the valuation will usually be based on fair rates. If the varied work is of a similar character and executed under similar conditions to work priced in the B/Q, such rates and prices shall be used to value the varied work.

Items covered by pricing preamble notes or descriptions in the bill item provide no entitlement. Considerations arising out of specifications, pre-contract addendums, manufacturing instructions and any minor details necessary for completion of work though not specified in specification or not shown in drawings are deemed to be included within the price. Any item duplicated in re-measure and superseded or rescinded by a subsequent instruction shall be ignored.

Any work, which exceeded the scope required by the variation order, is considered as overwork. Unless otherwise stated, any discount or correction factor will be applied for the original works as set out in the bill of quantities. Variations valued as per bill rates will also be subject to discount. This factor is proportionately applicable for the measured items under appropriate bills unless any specific mention as to contrary has been made at the tender.

If the varied work is of a dissimilar character or is executed under dissimilar conditions to work priced in the B/Q, then the rates and prices shall be used as the basis of valuation so far as may be reasonable. This rule applies where the work covered by the variation order is of a different character from the work priced in the B/Q, or is executed under different conditions. If the differences are relatively small, the Engineer is generally obliged to use the rates set out in the B/Q as the basis for his valuation, making such adjustment in proportion to take account of the differences. If the differences are very great, such as where excavation is to be in rock instead of clay, the Engineer may take the view that it would not be reasonable to base his valuation on the rates contained in the B/Q. The sole function of the words 'as shall in his opinion be reasonable and proper' found in many standard forms calls for a comparison between the work covered by the variation order and the work priced in the bill of quantities.

The words do not enable the Engineer to open up or disregard the rates on the ground that they were inserted by mistake. It was the use of the rates in the changed circumstances brought about by the variation order that must be reasonable, not the rates themselves. This is why the Engineer should decide the suitability of rates giving due regard to all the circumstances involved.

On the matter of overheads, a distinction had to be made between different elements of overheads. Some overheads such as home overheads are constant and not related to basic costs, unless brought into an assessment of the prolongation cost by reference to the basic costs. Other overheads are directly related to value of the work. Some overheads will only be recovered if there was proof that they were in fact incurred or increased, as they will have been recovered from valuations of the work executed. A fair valuation has a contribution towards fixed or running overheads. Care must be taken not to delicate any cost element with preliminaries which may be payable elsewhere in the valuation.

In nutshell, the work either added or omitted shall be valued at the rates set forth in the contract. If the contract does not contain any rate applicable for extra or additional work then suitable rate shall be agreed between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix rates as he decides reasonable. The Engineer is given powers to form his technical opinion as to suitability and applicability of the new rates.

Unit rates and prices in the bill of quantities establish the tender pricing level and provide the basis for evaluating any varied work. The principle of continuing throughout the contract period to assess the value of works commensurate with tender pricing conditions is a fundamental concept to be adhered to as far as may reasonably be deemed feasible. Within this principle, changes in specification and conditions of provision and application of works may require equivalent adjustments in valuation, proportionate to the tender pricing level, in order to reflect the altered circumstances.

Since intentions may be implied from conduct as well as expressed in words, the innocent party should act promptly upon notice requirements in a breach. In a Canadian case53, the sub-Contractors to do plastering were told in September that they would soon be required. However, due to delays arising because the main Contractor failed to provide temporary heating, they were not called upon until the following April. It was held that, even if this delay could have been treated as sufficiently serious to justify termination, the sub-Contractors' failure to complain about it deprived them of the right to terminate the sub-contract. As a result, the sub-Contractors were not in a position to demand a re-negotiation of their prices.

Also, the varied work shall be measured in accordance with the standard method of measurement adopted in the preparation of contract bills to maintain the uniformity in the total contract evaluation that

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53 Pigot Construction v Wi Crowe Lid

will be subject to final re-measure using physical measurements on site, approved as-built drawings, approved shop drawings or even latest revised drawings issued for construction, as the case may be.

Care must be exercised when making a direct comparison between different Contractors, which is not contractually admissible but may be a guide. Even though two Contractors are executing a job similar in nature or type, they exist as distinct and separate entities, where differing tendering criteria may have been employed. Equally, the circumstances of execution may have changed from that envisaged at tender stage which could impact upon the evaluation of varied work.

10.20 Day work basis

For work of a minor or incidental nature, the Engineer may instruct that a variation shall be executed on a day work basis. The work shall then be valued in accordance with the day work schedule included in the Contract.

A day work sheet is to record works carried out on day work basis only and signing day work sheet purports that the Engineer confirms that the usage of material, labour, plant etc on work is correct. The mere fact of signature does not make them legally binding automatically for the purpose of payment; however, it is likely to make them binding as to the agreement of the recorded hours. However, if the sheet was already fully priced before the Engineer signed it, it might be successfully argued that the intention was to agree with both the recorded time and stated evaluation, unless there was an express statement to the contrary.

If the inclusion of the work covered by the recorded time as part of the scope of work is in dispute, the Engineer generally has the discretion to decide and instruct on how the work is to be undertaken and valued. If the Contractor disagrees, it becomes a dispute by definition.

However, the submission of such day work sheet does not necessarily mean that the work will be valued under the clause dedicated for day works. There could be a valid reason for the Engineer to refuse or revise the payment but any determination shall not be unreasonably withheld or delayed. The Engineer's determination could be opened up, reviewed or revised later in the final settlement. Comments such as 'record purpose only', 'clarification only' etc are often found in day work sheets already signed and authenticated for the work carried out. This shall not affect the validity of the day work sheet but does not purport a particular entitlement.

10.21 What constitutes a separate contract?

There may be circumstances which could lead to changes introduced by the Engineer falling outside the variations clause. The works involved dredging in *Larne Lough*[54] in Ireland to enable larger vessels to dock. The tender referred to the dredged material being deposited in areas approved by the public authorities, the intention being to discharge the material excavated in suitable areas in the Lough. Larne Harbour Board rejected this proposal later and as a result an alternative plan was agreed to use the excavated material to form an artificial bird island. It was argued by the Contractor that this was not a variation to the works within the confines of the contract but a separate contract in its own right. The Court held that if the additional or varied work were so dissimilar from what any person reckoned to such an extent that it is not contemplated by the contract then it would constitute a separate contract. Hence, the construction of the bird island was wholly outside the scope of the original dredging contract and therefore constituted a separate contract.

When a large number of changes are instructed though they individually fall within the ambit of the variation clause, they can collectively have the effect of completely changing the scope of the works. This is referred to as either abandonment or cardinal change and deals with the situation where the Employer makes excessive changes to a project beyond what the parties reasonably could have anticipated at the time the contract is entered into. Courts will look at a number of factors in helping to decide whether the changes have been excessive such as the size, nature, complexity, expected duration the number of changes, how many changes were anticipated when the project started, the magnitude of the work involved in the changes and the length of time in which such changes were made, etc.

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[54] Blue Circle Industries Plc - v - Holland Dredging Company (UK) Ltd (1987) 37 BLR 40, (CA)

In a New Zealand case[55], the Judge Cook said that 'if a variation may fairly be said to be a change to the works as these described, whether it comprised and addition, reduction or substitution to the works or effects of carrying out the works, then it is a variation which the Contractor is under an obligation to carry out, if it is beyond that, it is not. A variation is compared and contrasted against current contract works. Thus the variations directed must be of a character and extent envisaged by and capable of being carried out under the provisions of the contract, by virtue of this relationship. The Employer can not order works deviating from their fundamental nature under the guise of variations.

10.22 Doctrine of cardinal change

A potential problem with the grant of such broad authority under the changes clause is that the unscrupulous Employer could order substantial changes to the original scope and still compel the Contractor to perform. The law provides the Contractor with relief in such situations. The cardinal change doctrine prohibits the Employer from ordering changes outside the general scope of the contract. Where the work ordered is outside the scope of the contract, it is not legally a change but is extra work, and the Contractor is justified in declining to perform it, as this work was not contemplated by the parties when they executed the contract.

Faced with a cardinal change, a Contractor has two options. It may perform the change and seek damages after completing the work, or it may refuse to perform. If the Contractor performs the changed work, it can suffer severe financial hardship until it proves and recovers breach of contract damages. If the Contractor opts not to perform, and the change is ultimately found not to be cardinal, the Contractor will have breached the contract because it was obligated by the contract to perform all of the original scope of work and all non-cardinal changes.

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[55] J&W Jemieson Construction vs City of Christchurch (1984)

The use of cardinal change doctrine is to detect whether the modified job was essentially the same work as the parties bargained for. The Contractor has no right to complain if the project it ultimately constructed was essentially the same as the one it contracted to construct. Conversely, there is a cardinal change if the ordered deviations 'altered the nature of the thing to be constructed'. However, it can be resolved only by considering the totality of the change which requires recourse to its magnitude as well as quality, in light of its own circumstances. The number of changes is not the test alone.

10.23 Potentially substantial increase in scope

Not necessarily disgusted all the time however, the Contractors have been struggling over the potentially substantial increase of the original contract scope in some exceptional cases. Where a road project for instance having a smaller number of major cost significant items, such as excavation into embankment, asphalting and road ancillaries, may have taken 2 to 3 times additional scope by just adding a few mileages ahead. However the nature of the newly added scope might have gone off the methods of execution as planned. Since the total scope has been potentially substantial, the Contractor's pricing strategies, technical approaches, and resource allocations etc might also have gone away with it. Though at glance the same nature of works at moving segments along the same route, localities etc, the Contractor may well be having a genuine case to ask for a total rate revision. On the allegation that the original planned duration has been elongated by 2 to 3 times coupled with varied works in between and as a result, the contract prices have been outdated, the Contractor may claim in addition to time extension and prolongation costs a rate revision for almost all the items that were executed.

On the other hand, the Employers contend that the Contractor has been in a windfall where he would have otherwise kept his resources idle due to lack of continuity of work in severe competition around the market. Contractors claim that the Employer is in a windfall where he avoided both time and cost on re-tendering and possible increase in contract prices with the new Contractors that may have taken over the site with delay in commencement also. Employers find comfortable with the same Contractor and the newly exploded scope can be procured under the disguise of variation clause.

As long as the parties mutually agree to share both pains and gains in the whole process, parties may wish to adjust their positions by allowing a reasonable contract price adjustment and the time to completion. However, there may be a restriction by law as far as the public money is involved in a project. Various limitations have been laid down in tender and financial regulations to govern the capacity of the Employer to decide on fund allocations. One of the rules is that the Employer reserves the right to issue variations under the contract subject to a limit of 20% of the original contract sum. It does not however capacitate the Contractor to ask for a rate revision or any other adjustment in the contract price.

10.24 Theory of quantum meruit

Where one person undertakes work for at the request of another, the law imports a contractual promise to pay. If there is no enforceable contractual obligation, the law will in appropriate circumstances apply a quantum meruit where it would be unjust for the recipient of the work or materials to retain their benefit without paying for them. This is the principle of restitution recognized in law the function of which is to bridge a gap where no contractual relationship exists. Also, the law will sometimes allow a quantum meruit notwithstanding the existence of a contract. If work is done without a written contract (whenever some of the legislation requires that building contracts must be in writing), the courts have allowed quantum meruit recovery. Also the clauses that restrict payments for additional work executed without authority in writing by the Employer but on the instructions of the Engineer (as often the Engineer is the sole source of instruction in any matter under the contract) may also purport a quantum meruit consideration. If the Engineer orders additional work, but without any authorisation by the Employer, it may readily be asserted by the Contractor that the effect of such a provision is that, the contract not governing his entitlement to payment for that work, he is entitled to a quantum meruit. These are questions of facts to be inferred under given circumstances. Hence, a quantum meruit claim may only be brought by a Contractor where, for whatever reason, there is no valid contract in place (since payment terms of a contract if existing will govern what monies the Contractor is entitled to).

A quantum meruit payment is allowable if the Contractor can prove the existence of unjust enrichment. There are key elements to be proved before an unjust enrichment claim can succeed. Firstly the Employer must receive a benefit on the premise that any Employer would have realised that any prudent Contractor would request for remuneration. In this instance, the Employer may contend that he had not asked the Contractor to do the work and would not have accepted the completed facility if it had known that the Contractor was performing the work. However, Courts have confirmed quantum meruit where the Employer receives an 'incontestable' benefit where no reasonable person could deny. For a quantum meruit payment, it must also be shown that a benefit has been accrued by the Employer and that it would be unjust if the Contractor were not remunerated – that is, the Contractor must establish that it would be unconscionable for the Employer to retain the benefit.

Basically, any variation that has been carried out without knowledge and without accruing a benefit for the Employer are not payable on the basis of quantum meruit, despite of whether a payment scheme is available. However, a Contractor may be entitled to recover for varied works on the theory of quantum meruit where conditions causing the damages are such that they could not reasonably have been anticipated by either party to the contract (the conditions are so substantially altered that they amount to a cardinal change). Thus, when an express contract is abandoned, Courts will imply an agreement that the Contractor is to be paid a reasonable value of its work. Coupled with this argument, quantum meruit may be used in cases when substantial changes occur which are not covered by the contract or within the contemplation of the parties and which are not such that the Contractor should have anticipated or discovered them but ultimately a benefit was brought in overall project delivery. As such, where the Employer has actual knowledge of the additional works, knows that they are outside the contract and knows that the Contractor is expecting to be paid for the works as extra to the contract, then a Contractor may be entitled to claim on a quantum meruit basis, provided the Employer receives a benefit, which is often the case.

10.25 Quantity changes in lump sum contracts

A change in the final quantities of work for an item may upset the balance of resources and method of working resulting in the unit price inaccurate. The actual quantity of work for an item may differ from the estimate at tender for a number of reasons. In the case of excavation for instance the removal of unsuitable material or the extent of rock or the extent of tunnelling in particular classification of ground, may only be estimated from ground investigation information and not exactly known until work is carried out. Similarly the length of piles driven to a specified depth may not be known precisely at each pile location.

The risk of errors may be either fallen into the Contractor or the Employer where the chances to alter quantities are remote even in a substantial variance. A clause that requires the Contractor to consider B/Q quantities as actual and correct and any error or omission from the B/Q provides no grounds to adjust the contract price (penalizing for someone else's mistakes). In contrary, another clause vests powers to the Engineer allowing room for re-measurement where the Engineer can order increase, decrease or even omit works, thereby determining the amount to be adjusted in the contract price.

However, mistakes in the bill descriptions or quantities are unlikely to be remedied as a legal rectification of the terms of the contract to reflect the true intention of the parties. The more likely practice is that the tender price prevails rather than a price revised to account of the error.

Although quantities are 'actual and correct', Contractors claim new rates when quantities substantially vary when the B/Q quantities are wrong. Contracts based on firm quantities are in essence lump sum contracts, where the quantity risk is transferred from the Employer to the Contractor. Although the burden of quantity risk lies entirely with the Contractor in typical lump sum contracts, question is why the Contractor is held liable for missing items and errors in quantities prepared by an 'outsider'.

The Consultant shall be held liable for quantity errors in case the Employer becomes vicariously liable. A specific remedy would be to cover up this scenario in the insurance policy. There should be a B/Q provision for the tenderer to adjust the quantities when he finds any missing, under measured or over measured item so that he takes the burden before the contract is entered into.

An entitlement of claim in a quantity change depends on what the contract says. Usually, the instructions to tenderers require the Contractor to submit a lump sum firm price, perhaps considering all the gamut of factors, be them commercial or technical, express and implied, so as to obtain a tender sum that is comprehensive enough to cover up all his obligations.

Lump sum is that one party agreed to pay the other party the full amount for the work described and the description could be in many sources such as drawings, B/Q, spec and so on. The point here is that the Contractor takes on board the quantity risk where the quantities are taken to have actual and correct on the originally envisaged scope of work.

However, sometimes, in the Form of Tender, the Contractor offers to construct, complete and maintain the whole of the works for a lump sum or such other sums as may be ascertained in accordance with the conditions. Accordingly, this type of contract is not strictly a traditional lump sum fixed price contract but a lump sum with a provision for re-measurement. The bill rates are applicable as long as they are suitable and the quantities of the selected items affected due to variation instruction will be reconciled on 'add and omit' basis between the billed quantities and the actual physical quantities, without re-measuring the tender drawings. The following table is to show the impact of quantity changes in a lump sum contract, whenever the parties are restricted within the bounds of bill quantities.

Ref	Item	Unit	B/Q Quantity	Quantity in Drawings	Final Actual Quantity
1	chandelier	No	10	10	10
2	plastering	m2	375		425
3	fire doors	No	12	8	8
4	handrail	m	25	32	31
5	dewatering	item			
6	excavation	m3	500		5000
7	aggregate base	m3	1000		100
8	plinth bases	No	0	0	14(shown in spec)

10.26 Estimated quantities

The clause titled 'Estimated Quantities' determines the character of the contract as a re-measurement when the quantities given in the bill of quantities are estimates only. The quantities may vary basically with the actual site conditions, due to errors and omissions in the bill of quantities and on account of variations, which shall not in any way vitiate or invalidate the contract.

It is not intended for the Contractor to use the existing quantities as a basis to fulfil his contractual obligations such as making purchase orders, preparing schedules and programming works etc. The provision of estimated quantities cannot be considered as however limiting or extending the scope of work to be carried out. The quantities in the bill in a re-measurement contract are purely for tendering purpose when the price to be paid for the works will not be fully established until the works are complete.

Accordingly, a provision is allocated in the contract with the purpose of laying down the procedure in respect of measuring works, whenever the contract is a re-measure. Equally the same procedures are applicable in cases where the re-measurement is allowed in lump sum contracts. Accordingly, the Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of work done upon verification by the Quantity Surveyor in accordance with the contract. The Engineer and/or the Quantity Surveyor shall, when it requires any part or parts of the works to be measured, give notice to the Contractor to immediately assist the Engineer and/or the Quantity Surveyor in taking and/or verifying such measurement. Should the Contractor not assist, then the measurement ascertained by the Engineer shall be the correct measurement of the relevant work.

For purpose of measuring such permanent work as is to be measured by records, the Contractor shall prepare measurement records month by month and the Contractor, as and when called upon to do so shall revisit and agree to any amended records with the Engineer and sign the same when so agreed. If the Contractor does not so revisit and agree such records, they shall be taken to be correct. If after revisit of such records the Contractor does not sign the same as agreed they shall nevertheless be taken to be correct unless the Contractor shall within the specified days of such revisit lodge with the Engineer and the Quantity Surveyor, a fully reasoned notice of the respects in which such records are claimed to be incorrect.

However, the measurement procedure varies with the way the parties have agreed. Sometimes, the Engineer shall ascertain and determine the quantity of work completed by measurement whereas the Contractor shall send his representative to assist the process of measurement and furnish all the particulars (back-ups) required. On the other hand, the Engineer's representative prepares records on monthly basis for measuring works as necessary, allowing the Contractor to examine and agree such records within a specified period. The records when agreed are to be signed by both parties. If the Contractor disagrees, such notice of disagreement shall be given within a specified period, which will be referred back to the Engineer. On receipt of such objection, the Engineer shall review, confirm or vary his records. Any delayed response by the Contractor will render the Engineer's unilateral decision, which will then be conclusive, final and binding.

Measurements taken in absence of the requested Contractor's assistance are always taken to be the correct measurements for payment purposes. If the Contractor does not attend to examine and agree the records prepared by the Engineer's representative for the measurement purpose, such measurements are reasonably presumed to be correct. Another obligation on the part of the Contractor is to examine and take additional levels and measurements as necessary in substructure works before the ground is interfered by any means, for the agreement on the existing levels with the Engineer. This will form the basis of the measurement of permanent works. In all cases, the works shall be measured as per the standard method of measurement specified in the Appendix to Tender, notwithstanding any general or local custom. The works shall be measured net except where the standard method of measurement does not provide for measurement rules.

10.27 Actual and correct quantities

Quantities set out in the bill of quantities are taken to be the actual and correct quantities to be executed by the Contractor. Any change in quantity including omissions shall not however vitiate the contract but shall be corrected and deemed to be a variation.

Within the meaning of the conditions of engagement, the Engineer is usually required to produce drawings as are necessary for the preparation of actual and correct quantities unless he can show reason why it is not possible. This does not restrict him to seek the Employer's approval to go by estimated quantities, basically on the availability of details and the time frame to float the tender.

On the other hand the Contractor is to intimate the Engineer of any change in the original quantities of work. However, it does not emphasize that the Contractor should satisfy himself as an additional obligation in the tender itself that the quantities given in the tender document are a fair representation of the proposed works; instead it is an opportunity to query any observation with regard to quantities during tender stage.

Some contracts require that any error in description or in quantity or omission of item from the bill of quantities shall be corrected and deemed a variation. It is therefore necessary to determine exactly what the bill of quantities should contain and what they actually do contain. This would mean that the Engineer reserves the right to revisit the bill items and correct the estimated quantities based on physical measurements as far as no specific mention as to contrary be made in the contract.

10.28 Variations after scheduled completion

The recent, *Balfour Beatty v Chestermount Properties*[56] is a model case related to a construction of shell and core of an office block. Work commenced on 19 September 1987, the completion date being 17 April 1989, later extended to 9 May 1989. The Architect issued a certificate stating that the works should be reasonably have been completed by this date, although the works had not being actually completed. During the period 12 February 1990 to 12 July 1990 the Architect issued instructions for fit out works as a variation to the contract. Practical completion of the shell and core was achieved on 12 October 1990 with the fit out works not finished until 25 February 1991. The Contractor was given two extensions upto 24 November 1989. The subject variation issued after the revised completion date but prior to practical completion, during the period when the Contractor was in default.

The Contractor argued that the effect of the issue of variations during a period of culpable delay was to render time at large, leaving the Contractor to complete within a reasonable time. This being the case, the Employer would lose his rights to levy penalties. Also, the Contractor argued that the Architect should have granted an extension of time on a gross basis. In this case it was argued that the fit out work should have taken 54 weeks, this period to be added to 12 February 1990, when the fit out variation was issued.

The Employer insisted a net extension of time, by taking the date currently fixed for completion and adding to it the 18 weeks that the Architect considered to be fair and reasonable for the fit out work. If the Contractor's method was followed it would provide him with a windfall which swept up his delays. While recognizing this, the Contractor considered the problem resulted from the Employer's own voluntary conduct in requiring a variation during a period of culpable delay.

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[56] Balfour Beatty Ltd v Chestermount Properties Ltd (1993)

If the net method were adopted the extended completion date would expire before the variation giving rise to the extension of time had been instructed, which was logically and physically impossible. Court however found in favour of the Employer on a number of grounds; the objective of the extension of time provisions is for the Architect to assess whether any of the relevant events have caused a delay and if so by how much. He must then apply the result of his assessment to give a revised completion date. It would need clear words in the contract to allow the Architect to depart from a requirement to extend the completion date by the period of delay caused by the relevant event. Mr Justice Colman said: "in the case of a variation which increases the works, a fair and reasonable adjustment may involve movement of this completion date to a point in time which may fall before the issue of the variation instruction".

Where an Employer's agent issues an order for extra work after the contract completion date but before practical completion, it is appropriate where resultant delays occur for an extension of time to be granted. Such extension of time will be calculated by extending the completion date by the net period of delay. The judgement in the case of Balfour Beatty vs Chestermount Properties alters the position of the Engineer who has to issue instructions while a Contractor is in culpable delay. Prior to the case, Contractors could claim new instructions had prevented the completion of the work within the agreed timetable. This removed their liability for liquidated damages. However, the ruling makes it clear that minor alterations issued after a period of delay do not alter the provisions of culpable delay.

10.29 Variations after practical completion

Variations cannot be ordered after practical completion in the absence of express provision, unless of course the Contractor is willing to carry out. A Contractor is not obliged to carry out variations where the instruction is issued after practical completion unless there is a clause in the contract which gives the Employer or his agent power to issue an instruction of this nature. *The Commissioner of State Bank vs Costain*[57] case illustrates the point that the power to order variations is not in force after the certificate of practical completion as it then reaches the stage for maintenance. This restriction has been reflected in some contracts.

The Contractor is not obliged to carry out any additional work after the date of practical completion other than attending to defects. However, the issue is what if the Contractor is willing to carry out, but not at the prices in the original contract? In principle, it may be work outside the contract if it is carried out after completion of the original contract work. Variations outside the contract may not be necessarily governed by the terms of the contract, and need not therefore be ordered in writing. The Employer is liable to pay a reasonable price for such work carried out at his request, but may exceptionally not be so liable if the original contract is not expressly or by implication replaced by a new contract and if there is no other basis for liability.

In order to make a person liable on a quantum meruit there has to be a necessary implication that the person liable is agreeing to pay. It is unlikely to be sufficient for a Contractor to claim after the works are completed that variation is outside the terms of the contract. Where the Contractor is willing to carry out extra work, but only at a reasonable price, then the parties should establish the basis on which they are prepared to proceed before works start. This is normally procured through an addendum to the contract.

When the Engineer issues a variation after the contract completion date but before the practical completion, it is appropriate where resultant delays occur for an extension of time to be granted. Such extension of time will be calculated by extending the completion date by the net period of delay taking omissions of the contract also into account.

The SCL protocol identifies that the main effect of time extension is to relieve the Contractor of its liability for liquidated damages during the period of extension, and not as often incorrectly believed, give rise to an automatic entitlement to compensation for prolongation costs. Some standard form contracts provide that specific delay events, at the

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[57] Commissioner of State Bank vs Costain (1983)

Employer's risk, will not entitle the Contractor to prolongation costs, such as delay resulting from adverse weather conditions. The protocol suggests that although not all contracts require the Contractor to give notice of the occurrence of an Employer risk event irrespective of whether it is likely to affect the contract completion date, notice should be given by the Contractor to the Engineer of an Employer's delay at the earliest practicable opportunity. Any impact of such an event should be dealt with cooperatively by the parties.

The time extension should be granted on the most predictable effect, and increased at a later stage if appropriate. A contract should allow the Engineer to determine that an EOT is due on his or her own initiative, whether or not the Contractor has applied for one or provided sufficient information. Such a clause should also entitle the Contractor to an EOT in case of variations ordered in the close play of handing over. Consideration of a time extension should also take into account the available float and concurrency.

The protocol recommends that the programme is used as the primary tool in determining the amount of time extension. A programme should be used in conjunction with contemporary evidence to ensure that the resulting EOT is fair and reasonable. The protocol also suggests that the analysis of the impact of events can be carried out retrospectively however; the method to analyse and assess delay and prolongation will largely depend upon the relevant conditions of contract; the nature of the causative events; the records available; the programme information available; and also the programmer's skill level and familiarity with the project.

10.30 Summary

A valid Engineer's variation instruction must meet the basic requirements; it must be in writing or verbally and subsequently confirmed in writing within a reasonable time frame unless otherwise expressly provided; be in respect of the form, quality or quantity of the works or any part of the works; and in the Engineer's opinion, be necessary or be otherwise appropriate. Summarily, there are three distinct scenarios. The Employer shall seek approval from the tender committee prior to issue any variation beyond a certain cut off limit, usually 20% of the original contract sum, to which an internal procedure is existing. Secondly, in a substantial increase of quantities for an individual pay item for which the clause 51 (in many forms) provides the way of evaluation, and Thirdly, the Contractor may submit a claim for the recovery of unabsorbed site and general overheads when the net resultant impact of variations has been found to be in excess of +/- 20% of the effective contract sum. The bottom line is whether the nature and amount of varied work compared with the nature and amount of whole of works rendered an existing bill rate(s) inapplicable or unreasonable. In nutshell, valuation of variations revolves around the doctrines of unjust enrichment, economic duress, quantum meruit, fair valuation and cardinal change.

CHAPTER 11
CLAIMS - 1

11.1 Introduction

Claims are inherent and inevitable in construction projects. They are a source of demand for additional time and/or money. Although claims usually flow from Contractor to the Employer, there are claims against the Contractors also. One should recognize that many elements, operating individually or in conjunction, affect the outcome of a claim. The basic elements are the contract between the parties, the facts of each individual case, the law which construes the contract and governs the dispute and also the interests of the parties involved.

By and large, the system seems working quite well but considering the giant size of the industry, there are also some giant sized claims. Much has been written and debated on claims. Perhaps some claims are inevitable for example justifiable extensions to avoid invalidating the contract. However, problems arise when the provision for claim is abused, for example by allegedly tendering at low prices with the objective of profiting out of others' mistakes and on the other hand by aggressively suppressing legitimate claims. Needless to say, the vicious circles generated by such exaggerated actions and reactions definitely add to the unavoidable costs of construction. Under circumstances, the whole idea of this chapter is to uncover some of the important considerations to be made in submission and evaluation of claims and salient features of different types of claims. Indeed, a fully fledged claim is rare.

11.2 He who asserts must prove

Generally, the law recognizes contract autonomy. Parties to the contract are allowed to determine their own terms and conditions as long as they do not contravene public policy and any mandatory provision of the law. One such example is the concept of good faith. Accordingly a contract must be performed in a manner consistent with the requirements of good faith. This is a principle of justice where for example if a promisor is himself the cause of the failure of performance, either of an obligation due to him or of a condition upon which his own liability depends, he cannot take advantage of the failure.

For a claim to be legitimate, the claimant should have a belief that he suffered a genuine loss because of the fault of the other party and as a result, he is entitled for compensation under the contract or otherwise. It is up to the claimant to prove his 'innocence' as well as the other party's liability thus the eligibility and quantum of any claim he wishes to lodge. Hence, the first principle is that he who asserts must prove, *actori incumbit onus probandi* i.e. the party claiming time and/or cost has to justify its allegations with evidence in support, that are contemporary in nature.

Substantiation means to provide documentary evidence in support of the assertions made within the claim submission. There is a minimum standard of substantiation required by the contract itself. The general standard of proof that matters need to be established as being correct is 'on the balance of probability'. Apparently, the lower standard of proof in civil matters does not imply that assertions need not be fully evidenced where it is reasonable to expect such evidence. So, for instance, a matter of evaluation that involves establishing the cost of overheads may require production of invoices, vouchers, delivery notes, and possibly other accounting records if relevant. Where such specific support is not possible, it will still be necessary to produce evidence of the overhead costs incurred with a reasoned analysis of the amount considered to be relevant. Accordingly, the extent of substantiation may vary upon the particular instance. It could be a full and detail substantiation or simply a matter of satisfaction of the Engineer being reasonable in all respects. As the claims involve a considerable money factor, the level of substantiation is also considerable in that the party asserting his position must come in clean hands with full and detail particulars.

11.3 Claims avoidance

Claims avoidance is to rid the project of unmanageable risks, ambiguities and impossible requirements in the contract documents prior to performance. The magnitude of the project may influence the kinds of procedures put into operation. A claims avoidance approach may involve a comprehensive review of the contract documents ensuring that these documents are understandable, unambiguous and consistent. This process entails making recommendations to revise, clarify and demystify the contract language, delete conflicting provisions, and incorporate a risk-sharing philosophy fair by both parties.

However the effects of risk events fallen cannot always be totally avoided or mitigated. There will be instances where a risk event occurs and its effects are alleged to give rise to an entitlement to additional time and/or payment. For instance, a frequent cause of claims is unresolved change orders, e.g., Employer-initiated additions or substitutions. In resolving variations, it is of the utmost importance to move quickly where negotiations should be taken place before the additional costs accrue.

11.4 Documenting claims

Courts and arbitrators tend to give a greater credence to written documentation than to testimony. If the claimant has no records, he will definitely lose his position. If he has some records, he may at least secure his position to establish the occurrence of claim events and compile them in sequence. Perhaps the purpose of record keeping is to record compliance with the contract, confirm verbal requests or instructions, report unforeseen events or conditions, record disagreements, and give timely notice of requests for additional time and/or compensation, and so forth.

Records become contemporary once they are collated at site level or at any source in the first instance and authenticated by the Engineer. The idea is to ensure reliability or virginity of the contents for a legitimate claim. As stated in the Oxford English Reference Dictionary the word 'contemporary' is defined as 'living or occurring at the same time'. Accordingly, it can be implied that 'contemporary records' are records that occur at the same time when any event or circumstance gives rise to a claim. In the *Falkland* case[58], the acting judge Sanders held that "contemporary records meant original or primary documents, produced or prepared at or about the time giving rise to the claim, whether by or for the Contractor or Employer".

For a successful claim, clear factual evidence is a crucial element. In pursuant to FIDIC 1999 – 4th paragraph of sub clause 20.1 (Contractor's Claim), the Contractor has been given a liability to keep contemporary records as may be necessary to substantiate any claim and further it notifies that those records must maintain either on the site or at another location acceptable to the Engineer. The Engineer may after receiving the notice, monitor record keeping and instruct the Contractor to keep further contemporary records, as the case may be. If instructed by the Engineer, the Contractor shall submit copies to the Engineer.

11.5 Claims analysis

Claims must be assessed on their own individual merits, albeit procedures for submissions and approvals, particularly when public money is involved. Examination of a claim however includes the considerations such as any reasonable extra expense incurred by a Contractor as a direct result of any alleged shortcomings of the Employer. The Contractor must demonstrate that he used his best endeavours to reduce the impact of the alleged shortcomings.

Claims analysis should also take a rational approach in order to simplify and streamline the whole process. The required chain of analysis is in the order of duty, breach, cause, effect and damage, which anticipates that the claiming party will fulfil each of the elements in order. That is, to establish what duty was owed to him by the other party, the cause of the alleged breach of duty, the facts of the breach itself, the effects of the breach, and lastly the damage that results from the breach in terms of time and/or cost.

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[58] HM Attorney General for the Falkland Islands v Gordon Forbes Construction Falklands Limited [2003] BLR 280

Duty is primarily concerned with establishing the obligations of the parties to the contract. It is important in doing so to confirm what the contractual liabilities are. Among the issues to address will be: What is the contract sum? How is it to be measured and adjusted? What notice, if any, has to be provided of financial impacts? Breach is a violation of the contract, have any of the obligations established as a 'duty' been breached? If so, in what respect? Is the breach negligible, material or posing a greater consequence? Cause is the cause of any breach in the contractual obligations? Is the cause relevant to any analysis of the impacts? and, finally the effect which is the resultant impact or net outcome. What are the financial impacts of the liability breaches? Are any of the financial impacts too remote to be claimed? Are the records of events and costs sufficient to support the claim being made? Should the impact have been mitigated from that being claimed?

Accordingly, in establishing a proper claim, the parties are intended to follow a sequence. This sequence requires that the person making the claim must first establish duty that was owed by someone, under the contract. Then must establish that the person who was under the duty was in breach of his duty by establishing in what way the duty was not performed. There after the cause of the breach should be established. Then the effect of the breach should be established. The effect can be described as the changes in the Contractor's purchases, resources and working methods etc. From this it should be possible to establish the damage that results from the breach and required as compensation.

To establish the link between breach, effect and damage there are three potential tests: (1) The 'but for' test; (2) The pragmatic test; (3) The common sense test. The "but for" test comprises the adoption of the questioning process of 'is it reasonable that but for the breach that effect and that damage would not have been suffered by the claimant?' The test was illustrated in an Australian court case[59].

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[59] South Australia Asset Management Corporation v. York Montague Ltd [1996]3 AII ER 365

Even though this is a good filter, this may need to be applied in a modified or extended manner when there are many overlapping and competing issues to test. The Courts in *Smith New Court Securities Ltd v. Scrimegour Vickers*[60] stated that "Our case law yields few secure footholds. But it is settled that at any rate in the law of obligations causation is to be categorized as an issue of facts. What has been further established is that the 'but for' test, although it often yields the right answer, does not always do so. That has led judges to apply the pragmatic test whether the condition in question was a substantial factor in producing the result" (Davison and Mullen, 2009).

Sometimes judges assert that the guiding criterion is whether in common sense terms to establish sufficient causal connection. In the *Yorkshire*[61] case the Lord Wright stated that, "This choice of the real or efficient cause from out of the whole complex of the facts must be made by applying common sense standards. Causation is to be understood as the man in the street, and not as the scientist or the metaphysician would understand it, without too microscopic analysis but on a broad view".

For a successful disruption claim, for instance establishing causal relationship is considered as an important element. Even though the nature and occurrence of the disruptive event are obvious in nature, establishing that the Contractor is legally entitled to compensation for a monetary loss suffered as a result of the event is more difficult. Proving causation has been a prevailing theme in considering the entitlement of loss of productivity claim (i.e., that the Employer's actions actually caused the inefficiency claimed).

11.6 Notice of claims

Where delays occur under a construction contract and the Contractor intends to claim an extension of time (and/or delay costs) the Contract usually provides for a notification regime. Almost in all cases, the Contractor is required to give notice of circumstances which might lead to a delay of any kind, immediately the Contractor becomes aware of such circumstances. This provision usually applies not only to circumstances out of which the Contractor might ultimately claim an extension of time, but to all other circumstances where the Contractor is likely to be delayed in achieving practical completion (even where, for example, the delay was caused through the Contractor's own fault and the Contractor is not entitled to such an extension of time).

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[60] Smith New Court Securities Ltd v. Scrimegour Vickers (1996) 4 All ER 769

[61] Yorkshire Dale Steamship Co v Minister of War Transport (1942) AC 691

In some contracts, there is a two-tier notification requirement, namely that the Contractor notify the Engineer (or the Employer as the case may be) immediately upon becoming aware of the likely occurrence of a delay, and again, providing details of the extent of the delay and other such matters, within a reasonable time of the Contractor being able to calculate the extent and likely cost and effect on scheduled completion. Where the Contractor fails to give the necessary notice (or as the case may be, either of the necessary two notices), the Contractor will be barred under the Contract from bringing a claim for an extension of time and/or delay costs.

There is a substantial body of law as to the effect of such time bar clauses. From time to time, Courts have declined to give effect to such time bar clauses for various reasons. A prudent Contractor who wishes to make such a claim should strictly comply with such time bar notice provisions. Sometimes, these provisions are equally applicable for the Employer. A notice shall be given as soon as practicable after the Employer became aware of the events or circumstances giving rise to claim. A notice relating to any extension of the defects notification period shall be given before the expiry of such period. Notice of claims is therefore fundamental in any claim, a failure of which may amount to disregard the claim in its entirety. A question arises whether the Contractor's failure to timely notify his intent to claim will lose his right to lodge his claim in toto. Notwithstanding, a prudent Contractor will be constantly vigilant for claim situations, and will give the earliest possible warning to the Employer, of his intent to claim and the anticipated grounds for doing so. In this way, under most contracts, the Contractor is able to preserve his rights to claim until such time as the necessary information can be collated.

Unlike suspension of work due to curfew declared by the government, for instance a Contractor may not know the real cause for the claim until some time after the events that have given rise to the situation. A typical case involves the accumulated impact of a series of changes, each of which may appear minor, but collectively have a disrupting effect out of all proportion to the work involved. Other changes may give rise to a re-scheduling of work, with consequent loss of productivity. Often, these impacts are difficult to determine until some time later. This is why some contracts find an open phrase 'as soon as is practicable' instead of strict deadlines from the true awareness of the occurrence. The phrase, 'as soon as practicable' connotes doing something with all reasonable dispatch having regard to all the circumstances.

11.7 Gaymark case

The Australian case of *Gaymark*[62] considered a claim by the Contractor for an extension of time where the Contractor failed to comply with the condition precedent for making claims. In that case, the Contractor was required to construct a hotel, retail and office complex. The Employer had his own causes that hampered the progress. The contract stated that the Contractor shall only be entitled to an extension of time for practical completion, where the Contractor has strictly complied, with its obligation in giving notice in writing of a delaying event, within 14 days after the cause of the delay first arising.

The Employer in turn claimed liquidated damages for the delay. The Court decided that it was clearly wrong to allow the Employer to claim liquidated damages for its own delays and refused to allow the claim and agreed that the contract between the parties fails to provide for a situation where the Employer caused actual delays to the Contractor achieving practical completion coupled with the failure by the Contractor to comply with the notice provisions. Finally, the liquidated damages were not imposable.

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[62] Gaymark Investments Pty Ltd v Walter Construction Group Ltd [1999] NTSC 143

11.8 Failure to notice or complete

In the Scottish case of *Shephard*[63], the Contractor was delayed in reaching completion. The Contractor argued that it was entitled to an extension of time as a result of instructions given by the Architect. The Contract set out a strict time limit for extension of time claims and clearly stated that the Contractor shall not be entitled to any extension of time if it does not claim in time.

The Contractor admitted that it failed to claim within the time frame but argued that the condition precedence acted as a penalty. In other words, the condition precedence set out a contractual provision that the Contractor had breached. The result of the breach is a liability to liquidated damages, which is not in proportion to the damage suffered by the Employer.

However the Court said that the Contractor's liability for liquidated damages does not result from a failure to comply with the notification provision but from the failure to complete on time. The failure to comply with the notification provision does not itself require the Contractor to pay liquidated damages but instead leads to the mere possibility that liquidated damages may become payable at a later date.

Traffic has both ways, however. Generally within the extension of time clause, the Contractor will be obligated to submit notices and detailed particulars within a specified time frame. For example, many contracts provide: "that the Engineer is not bound to make any determination unless the Contractor has (a) within 28 days after such an event has first arisen, notified the Engineer with a copy to the Employer, and (b) within 28 days, or such other reasonable time as may be agreed by the Engineer, after such notification submitted to the Engineer detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time." Occasionally, submission of notice and detailed particulars will be expressed to be condition precedent. The Contractor's failure to comply fully waives its entitlement to claim an extension of time so that the Employer's liability ceases.

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[63] City Inn Ltd v Shephard [2003] SCLR 795

On the same token, the FIDIC specifies a notice requirement for the Employer as well. If the Employer "considers himself to be entitled to any payment under any clause of these conditions or otherwise in connection with the Contract, and/or to any extension of the defects notification period, the Employer or the Engineer shall give notice and particulars to the Contractor." Such notice is required to be given "as soon as practicable after the Employer becomes aware of the event or circumstances giving rise to the claim".

11.9 The bottom-line

If a Contractor is only a few days late in submitting its sub-clause 20.1 (in FIDIC) notice in respect of very substantial claims and the forfeiture of its contractual rights would result in serious financial difficulties, then one might reasonably be entitled to argue that it would be contrary to good faith for the Employer to rely on clause 20.1. Similarly, if the Employer has actual knowledge of the "event or circumstance giving rise to the claim", and/or suffers no substantial harm as a result of not receiving the Contractor's notice on time, then, having regard to its implied obligation of good faith, the Employer may not be able to rely on sub-clause 20.1 to defeat the Contractor's claims.

In practice, much depends on the circumstances. The contractual obligation to deliver timely notice of one's intention to claim additional time or money will normally be upheld, unless the particular circumstances of the case show that such inclusion would lead to a misuse of a right or a breach of the parties' obligations.

11.10 Submission of claims

Weak claims are those submitted without showing the link between cause and effect. Consequently, whilst robust claims are not unheard, many Contractors have become accustomed to 'thin' submissions in the aim of negotiations. Contractors, who submit weak claims frequently gift the Engineer with many of the reasons they so desperately need to justify a refusal to make reasonable awards, more so in many instances where the Employer has the final 'word' on any determination by the Engineer.

A common claim is when often difficult to separate the delay and costs incurred following any delaying event. This is because there can be overlapping causes, such as variations to one part of the works issued at the same time that there are delays in providing drawings for the related part. Both the variation and the delay could allow a claim for an extension of time, but the exact length of the delay from each cause might be difficult to assess. The issues can be inextricably intertwined resulting in global claims.

Once submissions have been made, the Engineer has a specified number of days to make a decision. Accordingly, the Engineer can deny the claim in whole or in part, approve the claim, or notify the parties for further details or notify that the Engineer cannot resolve the issues connected with the claim.

The Engineer's written action will be final and binding upon Employer and Contractor. Once the Engineer makes a decision, if either party is unhappy with that decision, that party's next recourse is to invoke the dispute resolution provisions of the contract.

Some conditions mandate that the Contractor shall submit once in every month an account giving particulars of claims for any additional payment to which the Contractor may consider himself entitled. The Engineer is authorised to approve payment notwithstanding the Contractor's failure to comply with this condition if;

a. notice is given by the Contractor at the earliest practicable opportunity,
b. such claim is properly substantiated.

Compliance with timely submissions is vitally important to the Contractor if he fails, through unwarranted procedural delay, the Engineer may reserve a right to consider the claim as inadmissible. Belated claims suffering from clear-cut dilatoriness may be returned upfront.

11.11 Can the Engineer unilaterally evaluate a claim?

Once in every month the Contractor shall submit an account giving particulars, as full and detailed as possible, of all claims for any additional expense to which the Contractor may consider himself entitled. The Engineer's role in connection with claims is to authorize payments due under a proper review on the Contractor's submission. Accordingly, it is not only a U-turn to typical claim clause when the Engineer commits to notify of any financial implications to the Contractor, but also a serious breach of ethics on the part of the Engineer to initiate claims on behalf of the Contractor. This is inaptness when the Engineer's role is basically to protect the interests of the Employer being the Employer's agent. It is in fact the Contractor who should decide the basis of his own claims pending submission.

In case the Contractor fails to submit further details to support the valuation (the amounts alleged) or keep silence in a varied work that is amounting to a negative value for example, the Engineer may make his own assessment unilaterally, based on whatever bona fide evidence available, as befits the situation. This is usually done after a reasonable follow-up in order to fulfil the obligations on the part of the Engineer, in absence of cooperation from the Contractor. The Engineer's one-way assessment does not however prevent the Contractor in contesting the basis of calculation. In principle, the Engineer's judgement does not exceed what the Contractor has been looking for, unless there is an apparent error in calculations. This is *judex non reddit plus quam quod petens ipse requirit* where a judge does not give more than what the plaintiff himself demands. Meanwhile, the Engineer can not keep silence in front of any allegation, request, or query made by the Contractor since silence might be interpreted as acceptance. In law, he who does not disapprove, approves-*qui non improbat, approbat*

11.12 What a loss!

PRobertson[64] is a classic case that provided an interpretation on the phrase 'all direct costs and directly incurred losses' found in many standard forms of contract.

It was in a letter of intent the Joint Venture confirmed its intention to enter into a contract. There was a phrase in the letter of intent that "all direct costs and directly incurred losses" shall be underwritten by the joint venture. The letter was limited to a sum of £500, which was subsequently increased to £5million. The Contractor on the power of the letter of intent started works and nevertheless received interim payments. Once the spending limit of £5million was reached, the Contractor was told to stop work and as a result, the Contractor commenced legal proceedings against the joint venture claiming a further payment of about £850,000.

The heads of claim were loss of profit and overheads. The joint venture contested the Contractor's entitlement, arguing that the words "all direct costs and directly incurred losses" restricted the recovery by the Contractor to costs directly attributable to the construction works. This would include the cost of labour, plant and materials used, but would exclude costs attributable to the Contractor's enterprise as a whole, such as head office overheads and any profit element.

Whilst the expression "all direct costs and directly incurred losses" is not often heard, the judge noted that it nonetheless bears some similarity to the words "direct loss and/or expense" found in the JCT forms of contract. In each case the expression contains two elements; costs and losses in the letter of intent, and loss and expense in the JCT forms. The judge said that the words "cost" and "expense" are regularly used as synonyms to denote sums expended or outlays, and underpin the idea that a claimant is entitled to recover money that he has been compelled to pay in consequence of an event with contractual significance.

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[64] PRobertson Group Construction Ltd v Amey Miller (Edinburgh) Joint Venture (2005)

The concept of loss is based on the idea that a person does not have something that he should or would have deserved. In cases involving breach of contract, the general principle is that the innocent party is entitled to be put in the same position as he would have been in if the contract had been performed. The judge said it was obvious that a loss of that nature may include both loss of profit and a contribution to general overheads. The judge contended that by nature, businessmen expect profits and the law must recognize that elementary economic fact. The failure of a Contractor to make a profit should be accounted a loss, therefore.

The whole argument lies in between two principles; remoteness of loss, not with causation and the loss or expense in question arise naturally from the contractual event relied on by the claimant. This is in accordance with the first rule in Hadley v Baxendale (1854). As such, a Contractor can not earn profits but overheads in a disruption as the Contractor could not anticipate profits out of eventualities beyond his own control.

11.13 Financial loss

Courts are less willing to uphold duties of care based on reasonable foresight when a loss caused is purely financial and is unrelated to physical harm to person or property. A Contractor may be liable in negligence for failure to take care to avoid causing injury to a person who enters a building site, by the collapse of defective scaffolding. If the injured person has to stay in hospital for treatment he may suffer financial loss connected with his physical injury. However, supposing a Contractor through negligence damages a power line and causes a power failure that puts the bakers in the vicinity out of business? The bakers have suffered financial loss unconnected to any damage to their physical person or property. The Contractor could reasonably have foreseen that if there was a power failure the bakers would suffer financial loss. However, the Courts take the view recognising such liability would widen too much. Thus there is no general duty based on foreseeability to avoid causing pure financial losses.

A similar reluctance to recognise duties of care is seen with regard to careless words that cause financial loss. The foreseeability test has been applied to determine duties of care when careless words cause physical damage to person or property. For example, an Engineer who carelessly gives a professional opinion which results in harm to persons or damage to the building constructed according to that advice will be considered liable for negligence created by on the basis of a duty of foreseeability of the harm. However, if he gives a professional opinion which results in pure financial loss the Court may hold that this loss is unconnected with physical damage and that there is a need to restrict liability for such loss. Therefore, the criterion of foreseeability does not determine the duty of care due to the fear that it would lead to liability in an indeterminate amount for an indeterminate time and to an indeterminate class' (Cardozo C.J. in the *Ultramarine Corp.* (1931).

In nutshell, the law recognizes monetary compensation must aim 'to bring back the innocent party in the place they would have been had the contract been completed'. This is called its reliance loss. *Hadley v Baxendale* (1854) established the rules for deciding whether the defaulting party was liable for all the damage caused by their breach. This is commonly described under the rules of remoteness of damage; to decide whether a particular loss in the circumstances of the case is too remote to be recovered. There are two limbs to the rule where two parties have made a contract, which one of them has broken; the damages the other ought to receive in respect of such breach of such a contract should be such as may:

a. fairly and reasonably be considered as either arising naturally, i.e., from the usual course of things, from the breach of contract itself, or
b. such as may reasonably be supposed to have been in contemplation of both parties, at the time they made the contract, as the probable result of breach of it.

This contemplation of the parties was in fact, the principle of what the contract breaker knew or was taken to know, so as to bring the loss within the reasonable contemplation of the parties. In fact the crucial date for determining what 'may reasonably be supposed to have been in the contemplation of both parties' was the date of the contract, not the date of the breach, because it is then that the parties could limit their liability under the contract.

After all, in *Hadley v Baxendale* itself, the claim for loss of profits caused by delay in delivering the broken mill shaft to the repairers, failed under the second limb precisely for that reason. How were the couriers to know that the mill would have no back-up shaft? However, the construction issues are not that easy to resolve when deep technicalities come into play, for instance, a loss due to a knock on effect.

11.14 Contemplation

A court case with Balfour Beatty involvement[65] provided a unique example. During construction of an aqueduct, a batching plant broke down due to rupturing of the fuses provided by the supplier. It was then a watertight construction that required a continuous pour of concrete, which came to a complete stop with the power failure. Once it was restored, attempts were made to continue the work by cutting back the old concrete and adding fresh concrete. The Engineer instructed the demolition and rebuilding of the structure. In an action against the supplier the Contractor won damages for breach of contract. On appeal by the supplier against damages of £229,102.53 plus interest, the Lords confirmed that damages should either arise naturally from the breach or have been in the contemplation of the parties at the time they made the contract. What one party knew about the other's concerns was a question of fact. The demolition and reconstruction of the aqueduct was not in the contemplation of the supplier since they did not know, and were unlikely to know, that a continuous pour was indispensable to make the structure water-tight.

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[65] Balfour Beatty Construction Scotland Ltd v Scottish Power plc [1994] CILL 743

11.15 Causation

As in any claim, it is not simply a matter of developing a list of changes and a sequence of events. The Contractor must show 'how' changes caused the impact in terms of time and/or cost. There must be a sufficient connection between the breach and the loss in order to recover damages for the breach. Basically, the damage or loss itself must be caused by the breach of contract. This is called causation or causality that denotes the link between cause and effect.

Leyland Shipping v Norwich Union Fire Insurance[66] was a case involving damage to a ship during the First World War where the House of Lords had to decide what caused a ship to sink. The facts were in chronological order as follows;

a. On 30 January 1915, the ship was torpedoed by a German submarine. It was hit by two torpedoes. The crew abandoned the ship immediately believing that it was about to sink and boarded a tug boat.
b. However the ship did not sink. The tug boat was able to tow the ship into a nearby port of Havre. However, a storm began and the seas became rougher. The ship started hitting the side of the dock.
c. The Harbour Master fearing that the ship might sink required it to be towed to outside the inner walls of the harbour. The ship was moored outside of the harbour near the break water.
d. During the next two days, the storm continued, during which time the ship ran aground and on high tide re-floated. After two days of this constant battering, the ship sank.
e. The Employers of the ship made a claim on the insurance. The Insurers rejected the claim on the basis of an exclusion which excluded losses caused by war and hostilities.

The Court had to decide the cause of the loss amongst several competing causes. One issue of fact found by the Court was that had the ship remained in the port, i.e. if the Harbour Master did not require the ship to be removed, then it would not have sunk. However, the Court decided that the cause of the loss was the torpedoes. All of the other potential competing causes were taken to have flowed from the initial damage from the torpedoes. One crucial factor in that decision was that given the importance of Havre as a port during the war and the concern that the ship could have sunk, the Harbour Master's decision could not be faulted.

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[66] Leyland Shipping Co Ltd v Norwich Union Fire Insurance Society Ltd [1918] AC 350

Finally in legal terms, it is said that the torpedoes were the 'proximate' or 'dominant' cause of the loss. However, in *H Fairweather & Co Ltd v London Borough of Wandsworth*[67], the Court rejected the dominant cause approach as not being the correct way without stating an alternative. Also, the recent *John Doyle* case[68] has confirmed that the application of causation principle in construction claims.

11.16 Mitigation as a duty

The main remedy for breach of contract is damages. There are three rules relating to mitigation for breach of contract.

First an injured party cannot recover damages for a loss which could have been avoided by reasonable steps. The injured party is not required to do anything other than in the ordinary course of business. Second, if the injured party takes steps which he could not reasonably have been required to do, and avoids the potential loss he cannot recover the potential loss as damages. Thirdly, the injured party may recover his loss or expense in taking reasonable steps to mitigate the loss due to breach of contract.

In *White and Carter* case[69], it was held that the rules of mitigation do not apply in situations where the injured party has a legitimate interest in performing the contract rather than stopping and claiming damages. He is not required in that case to discontinue performance even though the Employer may no longer require him to continue.

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[67] H. Fairweather & Co. v. London Borough of Wandsworth (1987) 39 BLR 106

[68] John Doyle Construction Ltd v Laing Management (Scotland Ltd [2004] ScotCS 141

[69] White and Carter (Councils) Ltd -v- Mc Gregor (1962)

In the *Ascon* case[70], Judge Hicks QC held that it was difficult to see how there could be any room for the doctrine of mitigation in relation to damage suffered by reason of the Employers culpable delay in the face of express contractual machinery. This decision was made in relation a submission that the Contractor should have incurred additional expenditure in accelerating the works to overcome the delay.

It is suggested that the Contractor will have some obligation to progress the works which will involve an aspect of management of resources and planning of activities in the circumstances of actual events. Such an obligation will usually be intended by the parties to apply equally to events causing qualifying delays. The obligation to progress the works may however require the Contractor to take some positive action, and a failure to do so may sound in damages measured by the liquidated damages for additional period of over-run which could have been avoided but for the breach. Since the obligation to proceed 'regularly and diligently' means to proceed continuously, industriously and efficiently with appropriate physical resources so as to progress the works steadily towards completion, it is suggested this will also include managing the effects of the delay.

Although commonly referred to as a 'duty to mitigate' the loss, it is not a duty but a principle adopted in the measure of loss. The onus of proving the failure to mitigate rests on the party alleging the failure. Hence, the Contractor has general duty to mitigate the potential loss arising from delayed or disrupted contract works. A Contractor has the duty to minimize its costs in a situation of disruption in the similar manner as he must mitigate his damages after breach. A party cannot recover damages resulting from other party's breach of contract, if the damage would have been avoided by taking reasonable measures and if the mitigating measures were greater than what might be considered as reasonable and a party can only recover the cost of taking reasonable measures to mitigate his potential damage[71]. Further if the claimant incurs loss of expense by taking reasonable steps to mitigate the effects of breach, it is entitled to recover its consequential losses arising out of the mitigation. However, mitigation is not meant to be the minimum cost to be incurred as a result of breach. Neither has it meant to do everything possible to mitigate.

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[70] Ascon Contracting Limited -v- Alfred McAlpine Construction (1999)

[71] British Westinghouse v. Underground Railways Company (1912) AC 673

In the *Micafil*[72] case, the claim for acceleration costs of site works failed. There was a term of the contract that if unexpected delays and difficulties occurred, Motherwell was required to provide additional personnel at no extra cost at the request of Micafil in order to meet the required completion date. This is what parties have commercially bargained for in the contract.

11.17 Limitations in mitigation

A Contractor will not be able to claim extension of time for delays which could have been avoided by changing the planned sequences of working, unless the sequence is a specified sequence, so that he could carry on with other work as best he could. It cannot be considered reasonable that a Contractor should maintain his sequence of working, doing no further work and incurring delay when by changing the sequence he would be able to open up other areas of work and progress some of the works.

Mitigation is not the steps which would reduce productivity such as acceleration measures, and increase his direct costs by procuring additional plant or materials. In a real life project, the Contractor was under an obligation to carry out and complete the work involving deep sea diving in an expeditious and timely manner[73]. The sequence of the phases of work was specified in a program incorporated in a Memorandum of Agreement agreed by the parties as the way to deal with delays that had occurred. There were further delays. It was held that the obligation to progress the works in an expeditious and timely manner did not impose an obligation on the Contractor to carry out the work in a different sequence.

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[72] Motherwell Bridge Construction Limited v. Micafil Vakuumtecchnik (2002) TCC 81 CONLR44

[73] DSND Subsea Ltd v Petroleum Geo-Services ASA and PGS Offshore Technology AS [2000]

It is suggested also that if the entitlement to extension of time is on the basis of what is fair and reasonable, that this must include consideration of the positive steps taken by the Contractor to reduce the consequences of the delay, and the steps which could have been taken, without the expenditure of substantial sums.

If the entitlement is based on actual delay evaluated retrospectively and if the Contractor is entitled to recover losses due to the delay, then it is suggested that loss incurred in taking reasonable steps is part of the recoverable loss. If on the other hand the Contractor is awarded an extension of time prospectively, there is then no reason to mitigate the delay, since may be granted the compensation under the contract. Because of these difficulties, many standard forms require the Contractor to take steps to reduce the effects of delays, to mitigate the delay, but the extent of the obligation differs.

11.18 Best endeavour

The Contractor must use his best endeavours to reduce the delay. It is suggested that the obligation does not require the Contractor to expend substantial sums to reduce the delay. The best endeavours obligation was not necessarily the next best thing to an absolute obligation or guarantee[74]. Also, the best endeavours obligation only required a party to do what was commercially practicable and what it could reasonably do in the circumstances[75].

These will include applying resources in such a way as to reduce the consequences of a qualifying delay, so that work is carried out efficiently. It also includes providing the appropriate notices required by the contract together with the details required or requested by the Engineer.

In FIDIC 1999 Forms, Clause 8.1 of the FIDIC Red, Yellow and Silver Books 1999 require the Contractor to proceed with the works with due expedition and without delay. The determination of the extension of time is required under clause 3.5 to be a fair determination taking due regard of all relevant circumstances including the steps which could reasonably have been taken by the Contractor to mitigate the delay. In this regard the Contractor is also required, under clause 8.3, to promptly give notice of specific probable future events or circumstances which may delay execution of the works.

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[74] Midland Land Reclamation Ltd -v- Warren Energy Ltd (1997)

[75] Terrell -v- Mabie Todd and Co (1952)

It is also important to find the position of the SCL protocol. In all cases a party establishing a breach of contract shall be under a duty to take all reasonable measures to mitigate the loss which has occurred provided that he can do so without unreasonable cost or inconvenience. The protocol therefore considers that the Contractor's duty to mitigate its loss has two limbs. The Contractor must take reasonable steps to minimise its loss. Also, he must not take unreasonable steps that increase its loss. This suggests that the Contractor is usually required in construction contracts to do all it can to avoid, overcome or reduce delay, otherwise it may be *qui non obstat quod obstare potest facere videtur* which means that he who does not prevent what he is able to prevent, is considered as committing the thing.

This duty does not extend to carrying out any change in scope any more efficiently than the original scope; spend more money in order to negate the effects for example adding extra resources by working outside its planned working hours or otherwise. The Employer should pay the Contractor the costs of taking such measures to mitigate the loss if it requires the Contractor to do so. This is consistent with the common law principles in relation to a Contractor's duty to mitigate loss.

11.19 Foreseeability and remoteness

A damage suffered by reason of an intervening act by a third party whom the defendant could not have reasonably foreseen will not be recoverable from the defendant. This means that in the event a loss is sufficiently caused by the breach of contract, damages claims are also limited by the losses that the defendant reasonably ought to have foreseen to have flowed from the breach. This is called foreseeability judged in relation to the time the contract was formed, and not the time of the breach. If a defendant could not reasonably have foreseen that another might be affected by their actions, there may be no liability.

This is known as remoteness. The concept of remoteness has been a concept used in various areas of the law to limit the liability of a party for the consequences of his/her acts to consequences that are within the scope of a foreseeable risk.

Apparently because of the remoteness in damage where a precise justification or evaluation is difficult, if not impossible, it is always prudent to put forward evidence together with the prevalence of such causes through records in order to recall 'genuineness' of the issues before contesting on contractual eligibility at a later time. For example, if the Contractor encounters adverse physical conditions which he considers to have been unforeseeable, the Contractor shall give notice to the Engineer as soon as practicable. But it is essential to have the physical conditions clearly described in the notice so that they can be inspected by the Engineer, who may determine the reasons on why the Contractor considers them to be unforeseeable. However one would argue that the usual contract clauses are difficult to administer because they embody a subjective standard, i.e. the way the Engineer decides. The test of entitlement is again foreseeability, i.e., that which is foreseeable by an experienced Contractor does not qualify whereas that which is not, and which was not actually foreseen, does.

11.20 Time line

A timeline in the contract for filing notice of claims, for Engineer's response, and for dispute resolution to be invoked exists for a reason. Good contracts hold both the Employer and Contractor to the strict timeline provisions, and also to follow those provisions for actions the Engineer must take.

A timeline for filing claims is included in the conditions of contract to make sure that a decision on the claim can be made while conditions allow measurements and observations. If it were allowed to accumulate claims until the end of the contract and make them all at once, conditions at the job site may have progressed to a stage where the Engineer cannot make appropriate observations or measurements. The limit for the other party to respond to the claim exists to allow the claim to go to the Engineer for a decision in a timely manner.

The time limit upon the Engineer is to make sure that the disgruntled party will be able to make an informed decision about the possibility of going to dispute resolution while the situation is at a halt unsullied. If the Engineer were allowed 60 or even 90 days to make a decision, memories will have faded, and the party that loses out in the decision may not be able to make an informed decision. (Appendix D provides a time line using traditional forms)

11.21 Suspension

Suspension usually occurs when an Employer requires a Contractor to temporarily stop work on all or portion of the project. Contractually, the Contractor shall suspend the progress on the Engineer's written notice if it is only provided for in the contract, due to Contractor's default, due to climatic conditions, on safety reasons, necessary for proper execution of work or in excepted risks. A mandatory requirement is cast on the Contractor to give a written notice of his intention to claim for any additional cost and/or time within a specified period from the date of receiving the Engineer's order to suspend the work. This clause specifically permits the Engineer to authorize extension of time or payment of extra cost, and the decision is final and binding.

The clause 'suspension lasting more than 90 days' is by and large the suspension in one-go or part by part in consecutive periods, giving the Contractor the right to determine a contract in two ways. If the suspension under sub-clause 8.8 (Suspension of Work) has continued for more than 84 days (in FIDIC), the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under clause 13 (Variations and Adjustments) of the affected part of the works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under sub-clause 16.2 (Termination by Contractor). It will be sometimes treated as an abandonment of the contract by the Employer.

After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the works and the plant and materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the works or plant or materials, which has occurred during the suspension.

Suspension claims often require a schedule delay analysis to evaluate the impact on the critical path. A suspension claim will consist of cost calculations with regard to protection and securing works, idling labour, plant etc, loss of managerial inputs and any other incidental costs such as costs on demobilization/remobilization and other actual costs incurred due to the suspension. In addition, if the Employer's actions do not allow the work to proceed but the suspension clause has not been invoked, the Contractor may claim for constructive suspension.

However, a party, who wishes to exercise the right to suspend performance, runs the risk that their suspension will be regarded a failure to carry out the works regularly and diligently and may be treated as a repudiation of the contract, if in the particular circumstances no such right actually exists. The right to suspend performance for non-payment is statutory but the parties are free to agree how long the period is between the date on which a sum becomes due and the final date for payment of that sum. The period will vary between contracts.

11.22 Acceleration

Acceleration may occur from the other party's express or constructive order to increase the rate of production. An express order to accelerate does not have to be written or use the word 'accelerate' although it must direct the Contractor to increase its rate of production. It gives an impression that the increased effort will result in additional compensation.

In a recent decision, a Contractor sent a letter to a sub Contractor requiring that it increases its rate of production to meet the Contractor's revised schedule. A hand-written note on the letter stated that "all costs for the above will be negotiated at close out." The Contractor argued that the letter was not an order to accelerate because the sub Contractor had caused the delay and the revised schedule gave the sub Contractor more time to perform its work than the original schedule. The Court held that the letter was an express order to accelerate because it directed the sub Contractor to increase its rate of performance at a time when the weather conditions were less favourable than the original schedule. It too manifested an intention to pay the sub Contractor additional sums for such increased performance.

The SCL protocol defines constructive acceleration as "acceleration following failure by the Employer to recognize that the Contractor has encountered Employer delay for which it is entitled to an extension of time and which failure required the Contractor to accelerate its progress in order to complete the works by the prevailing contract completion date".

Sometimes, a Contractor may be forced into taking acceleration measures, anticipating completion of work in a given time using fixed labour and plant resources, but finds he cannot achieve planned progress because of an excusable delay. Therefore a time extension claim furnished but rejected. Since the Contractor wants to avoid liquidated damages without spending substantial extra sums of his own money to finish on time, he can have the extension claim resolved by arbitration or litigation. But, he cannot wait for the decision of the tribunal and run the risk of his claim being denied and therefore decides to accelerate the progress to complete on time, meanwhile convince the Employer that he was always entitled to an extension and payment of his acceleration costs in the pursuit of being compatible with the planned progress. This is basically constructive acceleration which is present when (1) the Contractor encountered an excusable delay entitling him to a time extension; (2) the Contractor requested an extension; (3) the request was refused or not act upon in a timely manner; (4) the Contractor was ordered to accelerate or finish the work as originally scheduled despite the excused delays; and (5) the Contractor actually accelerated the work. All five conditions must be met, although a request for a time extension and a denial of the request may be treated as an order to accelerate.

An order to accelerate does not have to be in explicit mandatory terms, as it may consist of merely pressing a Contractor to take additional action at a time when the Contractor could finish within the contract time including the periods of excusable delays pending approval. For example, it may consist of an Employer's unjustified pressure on a Contractor to employ larger crews and add more equipment. (Appendix G provides an example)

11.23 Micafil case

However, *Micafil*[76] refused to grant an extension to Motherwell who accelerated (working night shifts, extra men and plant) and claimed the extra costs of complying with Micafil's wish to finish the contract on time. It was held that (i) there had been excusable delays (ii) Micafil had refused to grant extension that Motherwell would have been entitled to under its sub-contract (iii) Motherwell had accelerated to meet the required progress, and had proved that but for the acceleration measures the works would have finished late (iv) Motherwell had written and told Micafil of the actual and projected extra acceleration costs either prior to or at the time of taking the necessary measures, and (v) Motherwell was entitled to the acceleration costs notified to Micafil. Motherwell suggests that if a party is wrongfully refused an extension and accelerates to avoid liquidated damages, it may be entitled to recover acceleration costs, even without the agreement of the Employer.

11.24 Bottom of the *Silver* lake[77]

The Army Corps of Engineers was engaged in a flood control project on the South Fork Zumbro River in Rochester, Minnesota. The Corps hired a Contractor to excavate material from the bottom of Silver Lake, a shallow reservoir located along the river. To facilitate dredging before start, the water level in the lake was lowered by about 8 feet, leaving the lakebed dry except for a small stream running through it. The Contractor intended to divert the remaining stream flow into a trench along the edge of the lakebed and construct an earthen dike to confine the water to the trench. The dike was designed to withstand a water flow of 800 cubic feet a second, a substantially higher rate than the average flow rate for Silver Lake, although it would reach much higher levels occasionally. Water flow in excess of 800 cubic feet a second could destroy the dike and flood the lakebed.

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[76] Motherwell Bridge Construction Limited vs Micafil Vakuumtechnik (2002)

[77] Fraser Construction Ltd vs United States (2004)

Before the Contractor's work began, the Corps pointed out that the Contractor's diversion system would be susceptible to damage by flow rates expected to occur between May and August and that delays due to such flows would not excusable for time extension. Shortly after the project began, Silver Lake began to experience high water flows because of wet weather in the region. The flow rate reached 1,320 cubic feet a second before completion of the Contractor's diversion dike, damaging the dike and flooding the work site. The Contractor spent most of the following two weeks repairing the dike, but it occurred again throughout July and August.

After the initial flooding, the Contractor requested a time extension from the Corps. The Corps denied the time extension request but, over the following months, granted several time extensions totalling 1 month on a project that was intended to take 3½ months. After completion of the contract, the Contractor submitted a claim for constructive acceleration, contending that the denial of reasonable extensions for high water flow during the contract period entitled the Contractor to an additional $659,760 on a contract for $744,588. The Contractor argued that time extensions granted after the fact by the Corps were not sufficient because upon initial denial of the time extension request by the Corps, the Contractor had been forced to continue its operations at an additional cost.

The Contractor's claim was denied and the Contractor sued in the Court of Federal Claims. The Court ruled that the Contractor did not establish constructive acceleration. The Contractor referred to the Court of Appeals where he argued that although the high water conditions it experienced were causally related to the repeated overtopping of its dike and although it was responsible for the direct, foreseeable consequences of such overtopping, it should not have been held responsible for the continued high water conditions that prevailed for days after each topping rather than receding. The Contractor further asserted that many of the time extensions granted by the Corps were useless because they were not granted on a timely basis. Finally, the Contractor argued that the Corps forced it to accelerate its performance by pressuring it to work on days it should have been given a time extension. The Contractor cited to a letter from the Corps urging the Contractor to adhere to its schedule and advising the Contractor that a failure to prosecute the work diligently would result in termination of the contract.

In the Fraser case, the Court began by defining construction acceleration and setting out the elements that must be proved to recover for constructive acceleration: A claim of acceleration is a claim for the increased costs that result when the Employer requires the Contractor to complete its performance in less time than was permitted under the contract. The claim arises under the changes clause of a contract; the basis for the claim is that the Employer has modified the contract by shortening the time for performance, either expressly (in the case of actual acceleration) or implicitly through its conduct (in the case of constructive acceleration), and that under the changes clause the Employer is required to compensate the Contractor for the additional costs incurred in effecting the change.

In nutshell, a claim of constructive acceleration ordinarily arises when the Employer requires the Contractor to adhere to the original performance deadline set forth in the contract even though the contract provides the Contractor with periods of excusable delay that entitle the Contractor to a longer performance period. Although different formulations have been used in setting forth the elements of constructive acceleration, the requirements are generally described to include the following elements, each of which must be proved by the Contractor that;

a. the Contractor encountered a delay that is excusable under the contract;
b. the Contractor made a timely and sufficient request for an extension of the contract schedule;
c. the Employer denied the Contractor's request for an extension or failed to act on it within a reasonable time;
d. the government insisted on completion of the contract within a period shorter than the period to which the Contractor would be entitled by taking into account the period of excusable

delay, after which the Contractor notified the Employer that it regarded the alleged order to accelerate as a constructive change in the contract; and

e. the Contractor was required to expend extra resources to compensate for the lost time and remain on schedule.

11.25 Positivity in response

Extension of time is a contractual remedy for acts of prevention and for events at the risk of the Employer. It may therefore be thought that if the remedy of extension of time is based on causation, then the 'duty to mitigate' should apply. In fact, there are two situations to consider, first when the Contractor responds positively and the second when the Contractor takes no positive action.

The Contractor may react on the qualifying delay by making changes to his methods of working, or sequence of working or even by accelerating the work. The issue is whether he is entitled to recover any loss incurred by this reaction and whether he has a right to react as he did. Subject to the express terms of the contract, the Contractor has may accelerate in a qualifying delay event but the additional costs in mitigating the effect of qualifying delays is his 'baby'. Sometimes, accelerating works in absence of the Engineer's knowledge or the Employer's consent has been forbidden. Since many contracts contain provisions for the grant of extensions of time and express terms for agreement of acceleration measures, the unilateral action by the Contractor in giving priority to the fixed date for completion over the cost of working efficiently cannot bind the Employer in those contracts.

In the second situation the Contractor may not react to the qualifying delay and the issue is then what minimum measures he is required to take in order to mitigate the effects of the qualifying delay, and if he fails to take those measures whether it affects the extent of his entitlement to extension of time. One argument is that the rules of mitigation do not generally apply to construction contracts in relation to time where there is extension of time provisions. The other is best effort argument.

11.26 Disruption

Disruption in its simplest sense is hindrance to actual progress thus reducing the output of construction resources, those being, primarily, labour and plant. Disruption costs may be distinguished from prolongation costs by virtue of the fact that the latter are a function of time and the former are essentially productivity related. Disruption may or may not result in delay. Disruption results in loss of productivity that delays the work being carried out and not necessarily the scheduled completion.

Contractors claim that they could not achieve their planned output because of the Employer's actions and that the damages are payable. To justify a disruption claim, a Contractor must establish that the actual progress has been interrupted and the cause of the disruption was either a breach of contract by the Employer or an action for which the contract provides for the reimbursement of extra cost. To warrant the payment of disruption costs, a Contractor must identify the particular work activities that were affected by the disruption and demonstrate that the disruption caused the Contractor to incur additional costs. The fact that there were many variations, no matter how many, does not give rise to an entitlement to a claim for loss of productivity.

For a disruption claim to be valid, therefore a Contractor must demonstrate disruption to actual progress, not planned progress as is often claimed. A 'work-as-executed' program should therefore be the basis for any justification of reduced productivity. However, there are many factors that can lead to a loss of productivity but provide no basis whatsoever for claims in instances such as union activity, low morale, working to rule etc that are usually not related to acts or omissions of the Employer. Even if the Employer does cause disruption, this may not result in an entitlement to additional payment, when the Contractor failed to comply with certain contractual requirements such as timely notice.

An example for a valid disruption is where the Employer ordered a Contractor to cease work on a particular activity for frequent short periods (for example to provide for some necessary operating function of a plant or building) and the need for such stoppages was not specified in the contract documents. Another example would be where the Employer ordered urgent variations and groups of workers had to continually move from one activity to another at short notice, being unable to exert an optimum productivity on a particular work activity. One more instance would be when the work progress is hampered due to traffic on the presence of very important person (VIP) at an unexpected time or without prior notice. Hence, a disruption claim must identify specific events that are disruptive by nature for which the contract specifically provides or reasonably inferred, for extra costs.

An executive summary of a real life claim is given below. Despite of their key statistics, it is important to understand the gravity behind disruption. It was a case where the main Contractor has been disturbed by another Contractor deployed during currency of the contract.

The submission has been compiled by M/S Contracting Company (known hereinafter as "the Contractor"), on a Contract for the construction of the project titled "premium tower", in order to demonstrate the Employer, M/S Premium Properties, and the Engineer, M/S Engineering Consultants (known hereinafter as "the Engineer") that the Contractor is contractually entitled to receive an award of time extension and reimbursement of additional costs in respect of delay and disruption caused by other Contractors, deployed on site (known hereinafter as "other Contractor/s").

The main allegation put forward in this submission is delay and disruption to works carried out, being presently carried out and will be carried out at the Employer's direct instructions either by means of work, or supply of materials, or equipment by the other Contractor. The Contractor confirms that he has been incurring substantial additional costs in respect of the delay and disruption and a detailed account of which is included in the submission, amounting US$ 50 Million for reimbursement. The Contractor wishes to note that this reimbursement is rightly due under the contract.

Following award of the Contract, the Contractor received the Engineer's letter ref. XYZ/2002 /012 dated 02 March 2003 advising him to carry out his works in co-ordination with another Contractor, M/S Wimpey Shinon (known hereinafter as "the infrastructure

Contractor"), with whom the Employer may have a separate contract. This announcement of the award of the infrastructure works to the other Contractor in and around the site was not brought to the Contractor's attention or intention at the time of tendering. The Infrastructure-Contractor's works have caused substantial delays and disruption to the Contractor's works on regular basis, thus shifting the completion date from 30 April 2004 to 05 July 2004. Hence, the claim for time extension is to demonstrate the Contractor's entitlement to complete the works no earlier than 05 July 2004. The Contractor also confirms that this submission for an extension of time and associated costs and expenses is submitted completely independent to any such previous claims, and without prejudice to any other rights reserved under the contract or otherwise.

The submission identifies several project specific events that caused delay and disruption on the works as a result of the Infrastructure-Contractor's works and demonstrates the effect on almost all the items on the critical path, involving slow down for periods from 30 minutes to several hours resulting in a productivity loss. Amongst the factors were obstructions to access, closure of temporary access, non-availability of access, development of new temporary access, slow movement of labour and plant in and around the site, frequent maintenance of temporary access, storage facility difficulties and multiple handling of materials, work stoppage, excess transport due to working in and around uncoordinated and unplanned areas, loss of productivity due to abnormal creation of dust and poor visibility, all of which contributing disruption and uneconomical use of resources.

Despite those disruptive elements, the Contractor at all times made his best efforts to mitigate the impacts by using additional resources, re-programming, holidays and weekends workings, extended hours of works, implementation of more temporary works and expedition of works out of sequence of the programme of the works as necessary. Notwithstanding the fact that the Employer was required to amend the works in order to reflect the delay and disruption experienced as a result of the award of a separate contract for infrastructure works, such amendment has not yet been endorsed as to the date of 31 December 2003.

Due to the fact that the Employer's failure to bring without any doubt to the Contractor's intention at the time of the tendering as to the presence of the Infrastructure-Contractor during the course of the Contract, the mitigation of delays and accommodating the infrastructure Contractor's works must be considered as gesture of goodwill in order to achieve the Employer's overall objective rather than a contractual obligation of the Contractor. Therefore, the Contractor submits that all costs and expenses incurred and likely to be incurred in respect of delay and disruption experienced by the Contractor as a result of the presence and operations of the Infrastructure-Contractor has not been accounted for in the contract sum.

The events in question have been notified to the Engineer in the required manner as detailed in the conditions of contract. Also it details out the particulars to show the contractual entitlement that require certification in accordance with the Contract, by giving due reference to the agreed programme of works, the actual delays suffered and additional costs incurred and the mitigation and acceleration methods adopted in the pursuit of scheduled completion.

Throughout the document, reference is made to statements, correspondence, minutes of meetings, monthly progress reports, etc. all of which are considered as valid materials in justifying the legitimacy of the claim. It was therefore expected that in accordance with the Contract, after due consultation with the Engineer and the Contractor the Employer shall grant and notify to the Engineer and the Contractor such extension of the Time for Completion of the whole of the Works as may in his opinion be reasonable in respect of completing the whole of the Works as caused by the other Contractor for which the Employer is accountable.

The Contractor is neither directly nor indirectly responsible, and which could not have been foreseen and prevented by the Contractor and which is beyond the reasonable control of the Contractor. The Contractor has fulfilled his other contractual obligations in terms of provision of notices within the period prescribed therein.

The confirmation of the Contractor's compliance to contractual obligations has been demonstrated also in the submission. This right for the Employer to grant due extension of time is to avoid time becoming at large thereby preserving the Employers right to deduct liquidated damages for delay in the event the Contractor is inexcusably delaying completion. The Contractor is of the opinion that the possibility of the liquidated damages being deducted by the Employer is negated, thus rendering damages clause inapplicable and unenforceable.

The Contractor also wishes to contend that the time frame for the Employer's contractual obligation to issue a variation orders does not extend beyond a 'reasonable' period of time. Literally, the Clause 22.1 of the conditions of contract (in this particular contract) suggests that the Contractor should not amend the works without receiving a formal variation order from the Employer. However, the nature of the works under consideration is such that the Contractor's works have been varied by the Infrastructure-Contractor. Accordingly, the Contractor had no option but to accommodate such disruption for reasons beyond his control.

Cost of disruption as a result of such changes occurred to the sequence and timing of the works as a result of accommodating the Infrastructure-Contractor's programme of works. This had materially prevented the Contractor proceeding with the works in accordance with the programme of works and in respect of which the Contractor has incurred a substantial cost. Details of the costs associated with delays and disruptions encountered are attached for the approval of the Engineer amounting to 50 Million US $.

11.26.1 Loss of productivity

The concept of productivity implies an avoidance of waste in all forms. In the context of construction, productivity refers to effective utilization of resources in site processes. Literally, it is the ratio of output to input, the relationship of which can be symbolically represented as;

$P = O / I$, where P is the productivity of a process, O is the output and I is the input.

Management of construction site involves several distinct and routine activities. Of these, the major activity is to control resources, such as materials, labour, plant, space and more importantly the time. Clearly, effective site management involves the use of proper systems and procedures and there are hundreds of factors that seriously impairing construction productivity. Although the precise effects of many of these factors are known, yet the effects of combination of them may become vague unless a proper record keeping and measurement technique has been adopted since commencement.

Productivity improvement in construction can best be understood when the total process at site level is visualized as a complete system which is made up of the construction project to which materials, labour, plant, management and money are inputs. They are consumed by the system in the process of producing the construction unit. Control of the system is achieved by collecting and processing information about the rates at which production is attained. To measure input/output, the parameter defined as productivity, two types of inputs to the system are used; the person-hour/unit and the cost/unit. The first focuses only on labour and is used for labour intensive operations. The second cost/unit combines all effects. The productivity of an operation is measured and compared to the values in the estimate.

If the actual productivity does not compare favourably with the estimated values, the input categories affecting productivity in the system – namely material timelines, labour effectiveness and management practices – need to be examined. To improve labour effectiveness, various factors can be addressed, including motivation, job safety, environmental factors and physical limitations. Management practices include scheduling, planning, data collection, job analysis and control whereas material timelines are ensured by proper procurement scheduling, site layout and a gamut of technical issues.

One of the most important factors is the people involved in site processes. Unless the workers share the goal with the management, the achievement of higher productivity will remain as an objective. Motivating workers of all the categories is a complex one as workers have varied motives that differ from person to person, time to time and place to place.

Researches reveal that the labour component in the total cost of construction is typically represented with a mean of 30% and a standard deviation of 10. The industrial dependence on a significant amount of labour creates problems of high cost, inadequate skills, and uncertainty of labour availability, worker attitude and supervision. All these concerns are related to variability of labour output. On the other and, labour and time components are co-related. Time robbers harm the site productivity in great deal. Few examples are uncontrolled telephone calls, casual visits, late appointments, impromptu tasks, shifting priorities, indecision, procrastination, too many meetings, unspecified roles, vague goals, unachievable target, conflicting directives, bureaucratic roadblocks (ego), excessive paperwork, constant pressure and interruptions, severe home constraints, lack of employee discipline etc.

Various researches have also revealed that over 1000 tons of site debris gets accumulated in a 10 storey building site when completed and only a handful of Contractors maintain a material reconciliation system to investigate material wastage at site. Many sites have inadequate storage facilities and lack of tidiness. A properly laid out site is the one, which gives the maximum productivity with the minimal wastage, which consists of a schematic placement of resources around the worksite during progress. Site plans, building plans, and service plans enable the site Engineer to earmark the space for storage and to regulate the receipt of materials in keeping with available space.

On many sites, the positioning of materials and the layout of temporary roads, scaffolds, access points, etc often develop haphazardly as the work proceeds and frequently leads to delays, wastage and inconvenience generally. A proper site layout is therefore necessary to improve productivity so as to reduce accidents, avoid confusion, enhance easy access, and minimize site movements and facilitate inspection. A site layout satisfying most of the above conditions increases productivity.

Materials amount to 50% or more of project costs. Research reveals that labour productivity gain of up to 6% through improved materials handling. There is a wide divergence in the degree of materials management applied to projects with the exception of few countries.

No common methodology has been used to measure its effectiveness. Although some companies, particularly large engineering contracting firms, have established computerized materials tracing system realizing the need for better materials management in their projects that use thousands of components, the majority has not switched onto computer aided tools in order to integrate good material handling systems into their operations.

Multiple or unusual change orders often cause productivity losses through ripple effect of changes. Many Courts of law recognize that there is cumulative impact above and beyond the change itself. However, a difficulty exists when isolating causal factors and their effects. As a result, it is very difficult for Employers and Contractors to agree on equitable adjustments for the cumulative impact. What is needed is therefore a reliable method (model) to identify and quantify the loss of productivity caused by the cumulative impact of change orders.

A number of studies have attempted to quantify the impact of change orders on the project costs and schedule, on the premise that works when originally envisaged can be organized according to an orderly flow of manpower, materials and sub Contractors using a logical sequence. When this orderly plan is impacted by a schedule change such as late deliveries of equipment, labour productivity can be reduced and can create a ripple effect on site operations. First, the Contractor may be forced to work outside the normal logical flow of activity sequencing. The rhythm of the project is then affected and more fragmentation of work activities results. Any chance to take advantage of the normal learning curve may be flawed away by the fact that the Contractor never reaches the full level of productivity that could otherwise have been achieved along with the planned progress.

Another source is that drawings are frequently criticized for lack of clarity and content, forcing field crews to device their own solutions. This is because of 'cut and paste' consultancy transferring part of the design function to the site, which is costly, disruptive, and inefficient. On the other hand, because of interdependency of construction operations, changes affect the productivity of other activities that are not a direct part of the change. This can also influence labour productivity in the form of learning and unlearning impact. Disruptions and delays collectively affect the productivity because of the stop-and-go of the operations, repetition of learning cycle, work being out of sequence, unbalanced crews and fluctuating in staffing levels.

Over engineering is a course of disruption too. Where the safety factor is a multiplier applied to the calculated maximum load (force, torque, bending moment or a combination) to which a component or assembly will be subjected, an overly factor of safety can account for imperfections in materials, flaws in assembly, material degradation, and uncertainty in load estimates. An appropriate factor of safety must therefore be chosen on several considerations including the accuracy of load, wear estimates, and probable consequences of failure. An ideal thumb rule to test the extent of over design is the weight of steel reinforcement in relation to concrete volume at different structural elements. This factor lies around 100kg per m3 concrete in a column at the level of 2nd floor in a maximum of 5 storey building. When it exceeds 150, the reinforcement layout becomes a congestive arrangement particularly in pouring and vibro-compacting in-situ concrete. None of these factors are considered to be valid causes for a legitimate claim.

11.26.2 Quantifying disruption costs

Where a contract does not prescribe a method for evaluating disruption costs, as in many cases, a Contractor might make an ambit claim for the difference between the amount allegedly allowed in the contract and the actual cost of the work performed. Such an approach falsely assumes that the amount allowed for the work at the time of tender was totally correct and there were no inefficiencies whatsoever to account in the Contractor's approaches and strategies in the management of site operations.

A Contractor must quantify the disruption costs once it has established that loss of productivity occurred and caused a loss in time and/or cost. This involves comparing the actual cost with what the cost would have been was it not for the disruption. The Contractor must demonstrate that both are reasonable, although they are hypothetical to some extent. In making such claims, a Contractor must also establish that everything reasonable has been done to minimize the cost of disruption, for example that hired machines were not left idle on site when the hire agreement could have been terminated. Cost details of the affected resources (as determined from the contemporaneous records of down time) may then be compiled from site records. On this basis any resulting disruption claim will be in respect of actual loss and expense incurred instead of reference to tender allowances.

The evaluation of disruption is usually carried out on the basis of a comparison of productivity prior to the disruptive events taken place, with that achieved during the period of disruption. However, the basis of calculation depends very much on the records in tact. There are various methods to quantify the loss of productivity and demonstrate the causation in the claims of labour and plant inefficiency. These methods include the 'measured mile' analysis, the 'industry standard' approach, the 'total cost' method, the 'modified total cost' approach, and the 'jury verdict' method, each having its own limitations and hypothesis.

The measured mile approach analyzes the Contractor's productivity during the segment (mileage) of the project duration in which the Contractor's work was not impeded by the Employer. This measure of productivity is then compared to the productivity experienced during the period of alleged disruption. It is actually the 'good period versus bad period analysis". The productivity rate for a period of disruption is quantified in lost worker hours, which are multiplied by an hourly rate to find the loss of labour productivity, for instance.

Hence, measured mile approach is where the periods of non impacted production are compared to the periods in the same project that have suffered substantial productivity loss, strictly because of one party's actions (the Employer). That party (the Employer) is then assigned responsibility for this difference. This method is considered appropriate in establishing a disruption and comparison is made on the man hours expended or the units of work performed. This method therefore operates on the premise that (1) the work performed during the mile is substantially similar in type, nature, and complexity to the work that was affected; (2) The composition and level of skill of the crew under consideration is comparable. (3) The measured mile also represents reasonably attainable labour productivity levels.

Calculating losses attributable to a specific impact requires very detailed and reliable information. In other words, productivity records are the basis for a measured mile analysis which requires a considerable effort in order to clearly identify Employer or Contractor caused inefficiencies on every activity. Other limitations to the approach arise from the assumptions that need to be made in order to draw the necessary inferences. It also requires that its referenced productivity norms are from an uninterrupted period. However, in many projects the work disruptions are so pervasive that there is no consecutive stretch of unimpeded work, and hence no measured mile period by theory.

Employers may disagree with a measured mile calculation by claiming that the baseline productivity measure-that is, the measure of the period unaffected by disruption-is faulty. A baseline productivity measure can be inaccurate and in fact, the 'good period versus bad period' comparison is not necessarily an 'apple to apple' comparison. The measured mile in its purest application measures two different periods of productivity for the same type of work performed under the same type of physical conditions on the same project.

In a loss of productivity claim, (assuming a road project for the purpose of discussion) the Contractor (the claimant) might argue that the rates and prices contained within the contract were predicated on the basis that the claimant would be able to execute the works in accordance with the major steps that were rooted in the contract itself, which were enshrined within the method statement. However, as a result of the respondent's variations, breaches and acts of prevention etc, etc, the necessary steps were not followed, the necessary contractual 'ingredients' were not available and the project which the claimant constructed was radically different from the project which was originally envisaged in the contract. As a result, there was a very significant decrease in the claimant's levels of productivity. The contractor may further argue in terms of capturing and quantifying the loss of productivity that a project of this scale which spans some hundreds of kilometres and was constructed over a period of many years, it is simply not possible to track the precise movement of each and every piece of plant, equipment and other resources including thousands of men operating with hundreds of machines. It would therefore be impossible to track their movements and be disproportionately expensive, and it would, in any event, detract from the claimant's efforts to complete the works. As a result, it would be similarly impossible, expensive and disproportionate to link the movement of every piece of equipment and resource to a specific cause or breach. Accordingly, rather than adopt some style of total cost claim, the Claimant has quantified its loss of productivity by adopting the approach known as the measured mile which compares (i) levels of productivity in a benchmark period of time where progress is undisrupted or least disrupted; with (ii) levels of productivity in a period of time where progress is disrupted by a known event.

As described, the productivity achieved during the undisrupted or least disrupted 'benchmark' period is described as the measured mile. Where the actual rate of productivity falls below the measured mile in a period of time where progress is disrupted by a known event for which the respondent is liable, there is a lack of productivity for which the respondent is liable to compensate the claimant. In formulating the measured mile, the claimant has adhered to the following principles:

a. The measured mile approach is predicated on actual performance rather than planned performance;
b. Issues such as inefficient working and the claimant's own delays have been factored out of the analysis;
c. Care has been taken to compare similar processes and disciplines, to ensure that the periods of disruption in respect of which compensation is claimed are a fair and accurate reflection of the conditions encountered;
d. The claimant has not compared work carried out during the 'learning' period of the project with work executed after that period;
e. Issues which could affect productivity but are unrelated to the respondent's liability, such as plant breakdowns, have been isolated and form no part of the Claimant's claim for disruption.

f. Such a claim can be brought as a series of alternative claims in respect of each period in which the claimant suffered a loss of productivity:

There is, of course, one very significant caveat to the measured mile analysis. It relies upon identifying a period of time where progress is undisrupted. However, because of the respondent's constant, persistent and all pervading variations, breaches and acts of prevention, the Contractor might argue that it has proved extraordinarily difficult to identify such a period. These alleged events may be the difficulties with access, the changes to the alignment of the right of way, the instructions to carry out further site investigation in relation to the unsuitable materials, the uncertainty over the lines and levels and the effect of the same on the profile of the cut slopes etc.

In the case of *Whittal Builders*[78], many difficulties were experienced by the Employer in giving possession of dwellings on a rehabilitation scheme. The Court found that during the period when these difficulties were in existence the Contractor was grossly hindered in the work progress and as a result, ordinary and economic work arrangements were rendered impossible. However, a stage was reached later after sometime when dwellings were handed over in an orderly fashion and no further disruption occurred. The Court had to decide upon the appropriate method of evaluating disruption.

Meanwhile, trade groups for various Contractors have published productivity tables that show how job site conditions can affect labour productivity. Particular conditions are scored in terms of their effect on productivity. A Contractor can use for instance the MCAA factors (Mechanical Contractors' Association of America's Productivity Factor Analysis) and ascertain how much the Contractor's productivity was affected by the Employer's disruption. These measurements are then quantified to show the loss of labour efficiency. Employers contend that industry standards are factually distinguishable from the conditions actually experienced on their job sites. Nonetheless, industry standards have been used successfully as a way to measure productivity.

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[78] Whittal Builders Company Ltd -v- Chester-Le Street District Council (1985)

The total cost method is based on the premise that the resulting project is a 'cardinal' change from what was originally contracted, that is, the current project is fundamentally different from the project envisioned by the contract. Once a cardinal change has been established, the Contractor is relaxed from the terms of the contract and is allowed to recover the additional costs on labour and materials, with a reasonable mark-up for overhead and profit. In effect, the total cost method turns a fixed-price contract into a mode of time-and-materials contract.

A Contractor using the total cost method must satisfy a four-part test. The Contractor must 1) demonstrate the impracticability of proving its actual losses directly, 2) prove that its bid was reasonable, 3) prove that its actual costs were reasonable, and 4) prove that it was not responsible for its added costs. On a public project, the judge first determined if the Contractor has submitted prima facie evidence that the four-part test has been established before the jury can be instructed on a total cost theory or a modified total cost theory of recovery.

A total cost claim occurs when a Contractor attempts to recover its entire man-hour overrun (i.e., the difference between its planned and actual man-hours) on a given scope of work. Total cost claims are popular with Contractors because they are easy to produce and they maximize a Contractor's potential recovery. The method can only be used if the Contractor can first satisfy a set of four prerequisites: As applied to loss of productivity claims, these four prerequisites are: (1) the planned productivity was reasonable; (2) the actual productivity was reasonable; (3) none of the productivity losses were non compensable; and (4) through no fault of the Contractor, a more accurate accounting of the compensable losses of productivity is unavailable.

The modified total cost method alters the total cost method by subtracting from the total costs any costs incurred by the Contractor due to its own inefficiencies. The main criticism on the total cost and modified total cost methods is that they can be used by Contractors to hide losses not caused by the Employer, such as those losses due to the Contractors' bidding errors or defective project management. Employers frequently seek to bar the total cost and modified total cost methods on these grounds.

Employers also contend that the Contractor's cost records are sufficiently detailed so that, during the course of a project, the Contractor could have tracked its costs to show an actual causal relationship between the Employer's actions and the Contractor's loss of production. Employers argue that to the extent the Contractor failed to adjust its accounting system to track job costs, the Contractor should be barred from using the total cost method.

The jury verdict method allows the trier of fact to determine recoverable disruption damages. To apply this method, a party must present 1) a clear proof of injury, 2) an indication that there is no more reliable method of computing damages than leaving the matter to the trier of fact, and 3) evidence of sufficient weight for the trier of fact to make a fair and reasonable approximation of damages. Frequently, Courts as the trier of fact use evidence submitted in support of other quantification methods, such as the total cost method, to derive a jury verdict calculation.

The jury verdict method affords Courts or boards the discretion to award damages when those damages have not otherwise been shown with specificity. The jury verdict approach is not one that the Contractor should use when making its claim. Rather, it is merely a tool available to the Courts to utilize the evidence presented in order to award costs to the Contractor when liability and causation are clear and other methods of calculating the lost productivity are not available.

Employers contend that the jury verdict method should not be used because the Contractor failed to meet its burden of demonstrating damages with reasonable certainty that the jury verdict method, in essence, amounts to nothing more than allowing the trier of fact to make a guess regarding what the Contractor's damages are, and this process frees the Contractor from its burden of showing breach, causation, and damage.

Baseline productivity analysis is another recent approach to ease out the difficulties associated with the above methods. Similar to the measured mile method, baseline analysis relies on the Contractor's actual performance of the project being analyzed. A central point of this analysis is to establish the baseline productivity. It represents the best and most consistent productivity the Contractor was able to achieve on the project and is used where un-impacted portion of the project cannot be found. From the claimant's perspective, this is a conservative measurement because the baseline productivity may still include an element of lost productivity. But because responsibility for that lost productivity cannot be easily measured and clearly assigned to the respective parties, the claimant uses the baseline period as a reference, even though some lost productivity may still be intertwined in the baseline rate.

This method does not require records with the same level of detail as the measured mile method. Base line built up with isolating non continuous set of data points. Also in the cases where no measured mile is apparent or available, a baseline productivity rate can still be determined and used to measure change. However, the baseline sample is identified according to the best daily output instead of the best daily productivity; and the requirement for the baseline sample size, usual being 10%, is arbitrary and not based upon on-site eventualities.

Another technique is system dynamics (SD) methodology that has been employed to detect the behaviour of various natural, social, and engineered systems. By using SD modelling quantification of cumulative impacts can overcome one of the major limitations of the measured mile and baseline analyses. As discussed earlier the two methods are not able to properly handle the multiple and/or concurrent disruptions caused by different project parties. SD models can correctly quantify Employer-responsible delay and disruption impact costs and demonstrate the cause–effect relationship of the cumulative impacts. A key feature of SD simulation modelling is that it directs answering a pool of "what if" questions such as: What if one particular category of disruptions had not occurred but all others had? What if the Employer interventions had not occurred? etc.

Finally the earned value analysis can be used to estimate the cumulative impacts, especially when the physical units of work completed have not been recorded adequately for employing a more reliable method like the measured mile. For a project the difference between earned hours determined from the earned value analysis method and actual hours expended for an impacted period can be used to compute the inefficiency sustained.

The credibility of the earned value analysis method can be questionable as the method is based on two parameters; the percent complete and the budget, where the percentage completed may not be as detailed and accurate as the physical units of work completed, and the original estimate is likely to be unsubstantiated. Any earned value analysis relying on an unreasonable budget is very doubtful.

The Canadian case of *Penvidic Contracting*[79] also provides some guidance on the manner in which disruption should be evaluated where an accurate evaluation is impossible. The dispute cropped up in a construction agreement to lay ballast and track for a railroad. The Employer was in breach of several obligations to facilitate the work. The Contractor, who had agreed to do the work for a certain sum per ton of ballast, claimed by way of damages the difference between that sum and the larger sum that he would have demanded had he foreseen the adverse conditions caused by the Employer's breach of contract. There was evidence that the larger sum would have been a reasonable estimate.

At the hearing, damages were awarded on the basis claimed, but on appeal this portion of the award was disallowed. On a further appeal, the Supreme Court held while restoring the trial judgement, that where proof of the actual additional costs caused by the breach of contract was difficult, it was proper to award damages on the basis used at trial. The difficulties of accurate assessment cannot relieve the wrongdoer of the duty of paying damages for the breach.

Let us assume an interim claim in a road widening project to a cut off date say, 31 Dec 2006 (effects are continuing as per the Contractor so that the Contractor can submit any number of claims till the effects cease). It has two components; extension of time and additional cost due to disruption occurred in selected areas and it excludes the cost of unproductive working (i.e., loss of productivity). The Contractor says delay events are widespread and extensive and only the main events have been considered, (altogether meaning that the Contractor intends to submit further claims). He may amend or update the contents at a later time whether the same is contained in this submission or otherwise, as he deems strategic. However, the source of claim is the disruption (although disruption does not necessarily cause delay in scheduled completion) resulting from existing utilities that were in excess of utilities indicated in contract drawings, utilities not in the locations indicated in these drawings, inadequate service corridor space provided in the Employer's design, existing utilities already situated within the corridors, unforeseeable underground cavities, re-design of pump stations, encroachment on the Contractor's right of way (ROW) to an underpass, prevention of trial excavations and utility relocation and excavations withheld.

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[79] Penvidic Contracting Co Ltd -v- International Nickel Co of Canada Ltd (1975)

Where the Employer is responsible for disruption to the progress of works i.e., where he has disturbed progress to items on the critical path so that the Contractor is delayed in the completion of work and suffered additional costs in completing the works, the Contractor may claim the cost of wasted or increased overheads incurred as a consequence of the disruption. As with other claims, the principle problem with providing evidence in support of such claims is not so much in identifying the actual cost incurred but in satisfying the Engineer that any additional cost claimed arises as a result of the event relied upon. In other words, the challenge is to satisfy the Engineer that, but for the disruptive event, the cost to the Contractor would have been less than it actually turned out to be and that the difference arose as the result of extension because of disruption.

11.27 Ex-gratia claims

An ex-gratia payment to a Contractor is one not due under the contract and usually represents compensation on grounds of hardship, sympathy or fair-play. A hardship payment may be described as one which is made without any legal obligation to do so. It is entirely discretionary. Hence, a loss by a Contractor is not itself a justification for making an ex-gratia payment. The fact is that the risk of loss is inherent in any commercial transaction and a Contractor should expect in the normal course of business to offset loss on one contract against the profit on another.

A situation might arise however, it would seem reasonable to consider a claim for an ex-gratia payment where the Contractor is able to demonstrate that he suffered undue hardship through circumstances outside his reasonable control which could not have been foreseen or avoided. Any approval must therefore carry the 'without prejudice' caveat.

Consideration will not normally be given to claims from Contractors who are under report for unsatisfactory work, under threat of imminent bankruptcy, receivership or administration, suspected of attempted fraud or in liquidation, where the concession would merely result in placing money in the hands of creditors.

Also, a payment of an ex-gratia claim should never exceed the actual amount of loss suffered by the Contractor (calculated by taking the unavoidable direct costs incurred). Where the contract was originally let after competition, and the loss arises out of circumstances peculiar to the Contractor (that are unlikely to have happened to another successful tenderer) it may be appropriate to limit any payment to the difference between the contract price and the value of the next lowest tender in the original competition. A careful examination of a Contractor's financial position must therefore be made before making an ex-gratia payment.

Consideration of ex-gratia claims may normally be deferred until after the contract is complete, because only then can the loss and hardship to the Contractor be truly assessed. However, the Employer may consider, subject to financial regulations, payment on ex-gratia basis, considering the circumstances in question, such as in the attempt to ease out the severe crisis in the cash flow so as not to affect the progress on site. More over the public interests may serve the basis of decision for an ex-gratia approval. For instance, in an unprecedented price escalation where the Contractor is not permitted to recover any financial loss as a reimbursement under the contract may well be having a payment on ex-gratia basis, provided he has fulfilled his obligations under the contract. Care must be taken not to grant any reimbursement for any period beyond the contractual completion in case a claim on time extension or penalty imposition is pending approval. It should also be noted that such a payment may not be referred to as on-account basis.

Also, the Contractor should demonstrate that a genuine effort has been taken to mitigate delay by acting diligently as per the standard norms and customs of the building trade. It is not to compensate pricing errors but may be for instance the unprecedented price escalation in the open market as a result of a global phenomenon. This is particularly admissible when the contract is silent rather than in a contract where the provision of price escalation has been purposely deleted, for instance.

11.28 Extra contractual claims

An extra-contractual payment is one which, although not legally due under the contract, appears to be an obligation by the Employer which the Courts might uphold. Such a claim would amount to an additional consideration, apart from what is expressly given in the contract.

These obligations usually arise from the Employer's action or inaction in relation to the contract (e.g. failure to comply with time limits within the contract for delivery of Employer-supplied materials or providing inadequate drawings, or other manufacturing information or the Employer requests for changes where no written amendment to the contract has been made).

A payment is regarded as extra-contractual even where there is doubt as to whether or not the Employer is liable to make the payment (e.g. where the contract provided for arbitration but a settlement is reached without recourse to arbitration). A payment made as a result of an arbitration award is contractual. An extra contractual payment would be made when the Employer decides such a payment would boost the productivity that is benefiting the Employer in long run, as long as such payment is made in good faith. Such a payment is made solely on the discretion of the Employer within the accounting provisions.

The distinction between 'contractual' and 'extra-contractual' is best illustrated by reference to indemnity payments. If however, a

Contractor properly terminates a contract by reason of breach on the part of Employer, the payment by Employer to the Contractor of a sum in settlement of the Contractor's legitimate claim for losses arising from the breach will be an extra-contractual payment.

However, under no circumstances should a claim be subject to detailed evaluation before its admissibility has been established in principle. This is necessary to avoid delay, and wasted time and effort, and to avoid compromising Employer's position with the Contractor. All parties need to comply with the requirement of public accountability in public projects.

Where there appears to be a valid basis for the claim, the amount of compensation will be for investigation, and the Contractor will be required to furnish evidence of the loss he incurred and to demonstrate that such loss was due to acts or omissions by Employer. On the other hand any additional cost to be incurred to bring benefits into the project by the Contractor could be considered as value engineering. Any correspondence with the Contractor regarding the claim and any agreed investigation of his records and accounts should be prefaced with the caveat 'without prejudice' to avoid conveying admission of liability or constraining Employer's contractual rights and negotiating position.

In certain circumstances, the Contractor will be entitled to claim payment for Works performed for goods provided, outside the terms of the payment provisions of the Contract. Where, for some reason, the Contractor provides services or goods but the Contract has somehow become inapplicable (for example, the rates for a particular item in a schedule of rates contract being based on particular quantities, those quantities have become widely inaccurate), the Contractor will be entitled to a claim in restitution, colloquially referred to as a 'quantum meruit' claim.

11.29 Quantum meriut claims

Quantum meruit is a Latin phrase meaning 'as much as deserved'. In the context of contract law, it means something along the lines of 'reasonable value of services'. In the United States, the elements of quantum meruit are determined by state common law. For example, to state a claim for unjust enrichment in New York, a plaintiff must allege that (1) defendant was enriched; (2) the enrichment was at plaintiff's expense; and (3) the circumstances were such that equity and good conscience require defendants to make restitution.

For example, when a person hires another to do work for him, and the contract is either not completed or is otherwise rendered un-performable the person performing may sue for the value of the improvements made or the services rendered to the defendant. The law implies a promise from the Employer to the workman that he will pay him for his services, as much as he may deserve or merit. In calculating a quantum meruit award, the values set forth in the contract are rebuttable, meaning the one who ultimately may have to pay the award can contest the value of services as set out in the contract.

Another example is that a person talks to a neighbour and tells him he is going to build a wall on their property that will give a benefit to both the person and his neighbour, the person implies that it would be cheaper for both of them instead of hiring a professional. The neighbour agrees that the wall should be built, but no price is negotiated. The person builds the wall, and then asks the neighbour to compensate him for the benefit of the wall that he conferred on the neighbour (usually half the value of the wall). The neighbour refuses. The man is entitled to some compensation based on quantum meruit. This is because there was an implied promise between the man and the neighbour, which is derived from contract law, because the man was acting under the assumption that the neighbour would pay for part of his services. Quantum meruit may therefore depend on equitable principle of unjust enrichment which is based on the need to prevent the neighbour from unjustly enriching himself by allowing the fence builder to proceed with the work based on an assumption that he would be compensated.

Another example is when a Contractor is contracted to work on a school. The Contractor does some work but then quits (breach of contract). The Contractor is entitled to be paid for the services he has already done for the school on the basis of quantum meruit (however the school may be entitled to damages arising out of the need to look for a new Contractor).

Unlike in a claim for loss and expense where the task is to put the innocent party in the same position it would have financially been in had it completed the whole job under the contract. In a quantum meruit claim, the approach is to assess a fair and reasonable value of the work performed. This involves a determination of the value of the benefit conferred on the receiving party. The amount recoverable on a quantum meruit claim may potentially exceed the amount that would have been recovered if the contract had been fully performed.

It is immaterial that a judgment on a quantum meruit basis might exceed the amount which would have been payable under the contract. A quantum meruit remedy rests on the fiction that the contract ceased to exist from the beginning. As a result where the claim is made on a quantum meruit basis, the contract price does not impose a ceiling on the amount recoverable.

The contract price may provide a guide to the reasonableness of the remuneration claimed, but is not 'the best evidence' of the value of the benefit conferred. A contract price is struck prospectively, based on the parties' expectation of the future course of events. A quantum meruit is assessed with the benefit of hindsight, on the basis of the events which actually happened.

Another example is where a certain portion of loss suffered by the Contractor is borne by the Employer particularly when a part of the contract works has been taken over by another Contractor (as a remedy in catching up the delays) on the basis of payment at a higher price quoted subsequently and when the Contractor has taken on board the risk of financial losses likely to incur due to price increase over a period for which he has consented to pay the cost difference.

Quantum meruit claims can also arise where pursuant to a schedule of rates the quantities for any particular item have become grossly different to the items specified in the original schedule (or are outside the limit of accuracy expressly provided for in the Contract). Quantum meruit may also be when the nature of the work performed pursuant to a fixed price contract is fundamentally or dramatically different from that which was tendered for. In such circumstances, the Contractor will be entitled, as a matter of restitution, in the absence of an applicable contractual entitlement, to be paid a reasonable sum for the goods provided all services performed.

In establishing a quantum meruit claim, the claimant must prove the total costs incurred and payments made by it in carrying out the works. The claimant must also establish that the amounts in question were fair and reasonable in the circumstances. The value of the work done can be proved by evidence of the actual costs incurred.

It is appropriate to ascertain what it would have cost to have the works carried out by another builder in comparable circumstances. This includes the entitlement to a profit margin. The inclusion of a margin for profit and overhead means that the calculation approximates the replacement cost of the works, the benefit conferred on the Employer.

The nature of a Quantum meruit claim is such that, typically, the entitlement in the Contractor to claims the Quantum meruit 'sneaks up' on the Employer without the claim ever having been foreseen. The basis for such claim is that, the Contract being no longer applicable, the Contractor is required to a reasonable sum.

11.30 Global claims

A global claim, sometimes referred to as rolled-up claims, is one where the claimant does not allege that a particular event led to result in a particular outcome but rather a series of events altogether resulted in a particular outcome. It is one where a total delay, disruption or cost is said to have been caused by multiple causes for which the Employer is responsible, but where the extent of the delay, disruption or cost attributable to each of those causes is not distinctly isolated. This means that it is not possible to say what amount of time or money wasted in each eventuality. Furthermore, global claims tend to camouflage all other alternative reasons as to why the total costs exceed the original contract sum, for example, unrealistically low tender price, inclement weather, labour shortages and price escalation.

However, in the case of *John Doyle*[80], the Inner House of the Court of Session defined the limits of global claims. Laing was the management Contractors who appointed Doyle as works Contractors for the superstructure of the building. Following the late completion of the works, Doyle claimed an extension of 22 weeks as well as loss and expense. Doyle in presenting its case had produced schedules and narratives detailing the causes of delay and disruption. The pleading stated "Despite best efforts, it is not possible to identify positive links between each such cause of delay and disruption and the cost consequences thereof". Laing sought to have the claim as pleaded struck out before trial.

It was common ground that in circumstances where the Defendant was culpable for all the causes of loss and there was, therefore, no requirement to apportion delay between specific events, a global claim could in principle be put forward. Laing contended, however, that where the Defendant was not liable for all the causes, it followed that there was a need to apportion delay between specific events but which was precluded, by the format of the global claim, with effect that the claim must fail.

The Court decided that, in principle, there is no problem with advancing a global claim if there are a large number of interacting events and the loss and expense attributable to each event cannot be shown. Provided the Contractor can specify the events, the responsibility of the Employer for each of them, the Employer's involvement in causing the global loss and the method by which the loss claimed has been calculated, the claim can succeed.

In dealing with the issue of concurrent delay, the Court drew a distinction between significant and insignificant causes of delay/ disruption and confirmed that where there is a significant or dominant cause of delay/disruption for which the Employer is not responsible, the global claim will fail. Conversely, if there are two causes of delay/

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[80] John Doyle Construction Ltd v Laing Management (Scotland) Ltd [2004] BLR 295

disruption but one is more significant or dominant than the other, then provided the Contractor can show that the Employer is responsible for the dominant cause, the claim could still succeed. The principles that can be drawn from this case therefore include;

a. Generally the Contractor must show that there is an event for which the Employer is responsible and a causal link to the loss and expense;
b. If the loss and expense results from a number of causes and the Contractor can show that all of the causes are the responsibility of the Employer, it is not necessary to show a causal link between individual events;
c. A global claim cannot succeed where any of the causes of the loss and expense are the fault of the Contractor; but
d. If the global claim does not succeed, then it does not mean that the Contractor has no claim. It may be possible to group claims using the dominant cause approach. It may also be possible to apportion the loss also.

Contractors should therefore identify all the significant or dominant causes of the delay/disruption for which the Employer is responsible and which have caused them to incur loss and then make a reasonable attempt to allocate sums of loss to these causes or events. If the Contractor fails to provide evidence, the global claim will fail in its entirety.

The SCL protocol discourages global claims that do not substantiate the cause and effect of delay. Although this is consistent with the Courts' general reluctance to accept global claims, Courts will in appropriate circumstances still consider such claims. In the *John Holland* case[81], McClellan J considered that it was irrelevant that the claim was described as a 'global claim'. His Honour held that 'a plaintiff who has a claim will not be denied the opportunity to prosecute that claim only because there may be difficultly in identifying with precision each individual element of the claim'. The global claim for delay costs could be accepted if there is sufficient evidence to establish a quantifiable loss.

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[81] John Holland Pty Ltd v Hunter Valley Earthmoving Co Pty Ltd (2002) NSWSC 131

11.31 Price escalation

Many standard forms allow for the treatment of inflation by connecting various practice manuals, guidelines, protocols etc that have been specifically drafted to deal with construction inflation. Instrumental by various promotional and regulatory bodies, these manuals categorically prescribe formula methods of compensating any escalated components of prices of building materials, labour and/or plants and equipment using indices. The basic use of an index is to convert a price at one point in time to a different price at another point in time.

FIDIC model conditions of contract also deal with inflation, foreign currency exchange fluctuations and other financial risks. Clause 13.8 of model conditions of contract for building and civil works (designed by the Employer) refer to 'table of adjustment data' included in the Appendix to Tender. If this sub clause applies in a given contract, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, goods and other inputs to the works, by the addition or deduction of the amounts determined by the formula prescribed in this sub-clause. (Appendix F provides a brief account).

The formula shall be of the general type; $Pn = a + b\ Ln/Lo + c\ Mn/Mo + d\ En/Eo + \ldots\ldots\ldots$ where Pn is the adjustment multiplier to be applied to the estimated contract value of the works carried out in period 'n', this period being a month unless otherwise stated in the Appendix to tender; 'a' is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustment portion in a contractual payment; 'b', 'c', and 'd' , … are coefficients representing the estimated proportion of each cost element related to the execution of the works. Such tabulated cost elements may be indicative of resources such as labour, equipment and materials.

Ln, Mn, En,…. are the current cost indices or reference prices for period n, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period (to which the particular payment certificate relates); and Lo, Mo, Eo,…. are the current cost indices or reference prices for period n, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the base date.

However, in many other instances, where no indices are published, parties may agree on a traditional method of calculating the escalated component purely on documentary proofs such as invoices. Although it is considered as administratively difficult for the Employer to check the validity of invoices, and monitor the occurrence and extent of the Contractor's loss thereby, some parameters have been agreed upon in advance in order to ease out the difficulties in administration. These are basically exclusions the prevalence in which the Contractor is not entitled for compensation.

Formula applications are dependent upon the availability of reliable indices published at regular intervals to track price movements of basic inputs fed into the formula. The World Bank adds another correction factor that is of currency exchange rate correction to price adjustment. It provides the exchange rate schedule for its own use. The cost indices or reference prices stated in the table of adjustment data shall be used. If their source is in doubt, it shall be determined by the Engineer. For this purpose, reference shall be made to the values of the indices at stated dates for the purposes of clarification of the source; although these dates as well as values may not necessarily correspond to the base cost indices. This is some kind of a pro-rata adjustment. In cases where the "currency of index" (stated in the table) is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, as usually established by the central bank of the Country, of this relevant currency on the above date for which the index is required to be applicable. Until such time as each current cost index is available, the Engineer shall determine a provisional index for the issue of Interim Payment Certificates. When a current cost index is available, the adjustment shall be recalculated accordingly.

The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of

Variations. Under circumstances, the Engineer has been given wide powers to determine the gaps in publications, and is why formula applications are desirable only in regulated industries where the parties can reply on published data periodically.

Irrespective of the method of computation, the purpose of a fluctuation clause is to provide a mechanism for reimbursing Contractors for changes in input prices over which they have no control at all. It provides a way ultimately for contract price adjustment in respect of externally imposed fluctuations in prices of materials, labour, plant etc. The premise behind compensation should be that the market induced vacillations are generally borne by the Contract rather than the Contractor alone, although it is usually insisted in the tender document itself by inclusion of an instruction that the rates shall be comprehensive to include the likely escalations, in some contracts. Accordingly, the Contractor shall allow for possible increases in the input prices for the period scheduled for completion. However, the foreseeability comes into play again in establishing the eligibility for compensation. Foreseeability is not necessarily related linearly with the time factor as there can be unprecedented price increases. Optionally, the adjustments to the Contract Price shall be made in respect of rise or fall in the cost of materials provided the period of completion exceed a definite period such as one (1) calendar year. Such a provision would not however impair the Contractor's eligibility for exceptional price increases that would take place before the specified period reaches.

However, it may be cheaper in long run for the Employer to pay for what did happen rather than what the Contractor thought might happen in those areas of doubt which the Contractor can not influence. The benefit of the doubt would then be passed on to the Employer in an economic deflation. The formula based computation methods in this case allow the tenderers to overcome the risk of providing an additional mark-up with a view to compensate for the unforeseen price variations. The aim behind any strategy should be to reasonably reimburse the Contractor for those eventualities he could not reasonably foresee in advance. A formula method of computation will also avoid strategic manipulations and claims at large, but accurate input proportions and reliable cost indices are integral components in such a mechanism.

Whenever, open market vacillations are a risk to the Contractors who are locked into pure lump sum fixed-priced contracts. A surge in material costs may considerably affect their bottom lines where profit margins are not as high as they once were. As a result, Contractors have been searching for recovery means, of course through claims on their own basis. Many Contractors use consumer price index (CPI) as the basis of claim although the purpose of the index is something else. Contractors will have a difficult, if not impossible task in getting respite from such increases. Even if the contract has become economically burdensome, that is unlikely to be sufficient to excuse performance. The only way to get rid of this issue is to compensate the additional cost on ex-gratia basis in existing contracts and share the risk on a contractual basis in future contracts.

As a control in the number of claims over price escalation, sometimes, the Employer itself provides fixed rates for selected materials with a list of accredited suppliers. B/Q items with materials supplied by accredited suppliers shall be priced in two different places in the tender document: Supply cost to be priced under a separate schedule and all other costs under work item in the B/Q, eventually resulting in the exclusion of material costs in the contract rates. Unfortunately, this method not only changes the standard way of pricing but also makes the evaluation of variations cumbersome. Moreover, it is an unnecessary infiltration on to the pricing strategies the Contractors may employ from project to project on different basis. Duplication in costing of materials may occur since the cost of a particular material can be included under several bill items. Instructing the bidders to be careful in duplication would not suffice. It is also not clear which party is bearing the risk of quantity mistakes (if any) included in the materials price schedule. There is no procedure for dealing with quantity errors, since the Contractor has to order the actual material quantities irrespective of scheduled quantities.

The rates contained in the priced B/Q are deemed to be based upon the open market prices of materials, unless the source of procurement has been specifically stated otherwise in the Contract, applicable at specified days prior to the scheduled date for closing of Tenders. These 'basic' prices of the specified materials against specified items of the

B/Q usually form part of the Appendix to Tender for the purpose of contract price adjustment.

Another restraint is that the adjustments to the contract price may only be considered in respect of price fluctuations vary by more or less than a specified percentage of the prices which prevailed specified days prior to the scheduled date of submission of Tenders compared with the prevailing prices at the time of procurement in accordance with the materials procurement plan as approved by the Engineer from time to time. Only the net difference of prices shall be considered in the adjustment exclusive of profits and overheads of the Contractor.

The adjustment to the contract price shall be calculated by applying the net difference of prices to the quantity of work under respective specified items of permanent works. The adjustment shall only apply to the estimated quantities of work in respect of lump sum contracts and actual quantities determined in accordance with the variation clause in respect of re-measure Contracts. The Employer also reserves the right to specify the source of procurement where the Contract Price adjustment shall be made only on the prices of such materials purchased from sources as specified in the Contract.

Obligations take precedence all the times. The Contractor shall forthwith, or the Engineer shall give notice to the Contractor upon the occurrence of any event which may or may be likely to give rise to adjustment of the contract price, give notice to the Engineer and the Contractor shall keep such invoices, accounts, documents or records as are necessary to enable cost adjustment. These records eventually become contemporary as the Engineer may require in review of a future claim.

The Contractor shall keep the Engineer informed in advance of the procurement of such specified materials at the most economical prices available at the time of purchase to be made in compatible with the procurement plan and/or actual progress. No account shall be taken in increase of costs which may be attributable to lack of diligence on the part of the Contractor. Also provided that if the Engineer and Contractor are unable to agree on price escalation for the specified materials, or the Contractor fails to fulfil the obligations in submission of a claim for adjustment of the contract price, then the Engineer shall fix, as shall in his opinion be, reasonable and proper having regard to the circumstances.

A basic complication is that when different types of materials are purchased and consumed during different time of the contract. The usual way of computing the reimbursement is by multiplying the quantity consumed by the change of price, which is a tedious process. Using the indices, the cost adjustment can be calculated conveniently. It is therefore a practice to list out the basic prices of materials for which current price is based on, in the contract document. Under circumstance, parties sometimes take a traditional approach in an easy-to-understand manner, by removing complications traditionally associated in the administration.

As such, the projects the duration of which is below One (1) calendar year may not be considered for reimbursement of any price escalation on the assumption that the Contractors are in a position to foresee the likely price escalation at the time of bidding for shorter durations. This can be changed to a lesser period if necessary.

The contract price adjustment will be made only on the selected items in the bill of quantities. The question of administering procurement, site delivery, calculating wastage, materials excess, double or multiple handling etc does not arise whenever the adjustment is made related to the physical quantity of permanent work at site. Hence, only the specified materials of the specified items are considered for price adjustment on the basis of cost significance. Usually a 20% of the bill items represents 80% of the total project cost (in line with perato principle) which is often correct in building projects and not far wrong in civil projects.

It is reasonably assumed that the rates for the varied work shall already consider the escalation so that varied works (except quantity increase and decrease in re-measure contracts) are not subject to contract price adjustment. As mentioned, only the materials incorporated into permanent works may be considered for cost reimbursement. Therefore, the temporary works, plant and equipments, tools and consumables, small items as well as fuel and water, etc and omitted works and Employer-supplied materials have been totally excluded in the cost reimbursement. This avoids anomaly where the payment on escalation caused by the increase in prices of certain materials may be made at a time when such materials were not used at all.

Tender price break-up plays an important role to decide on the price quoted in materials, showing the other cost elements such as labour, plant, tools, wastage, site and head office overheads, and profit, as well as trade discounts on bulk purchase apart. Hence, the purchase price at actual procurement will establish the current rate that excludes the cost on delivery to site.

Only the estimated bill quantity in case of lump sum or the actual quantity in re-measure Contracts will be considered for cost reimbursement. This avoids over compensation on over purchased materials, materials wastage during transport, usage and in application, redundant materials at the completion, etc.

If properly administered, this method automatically detects a price fall where the Employer will gain the benefit of price reduction on the open market, once cut off limit is exceeded. However, if the current price is within a margin of 10% above or below the Basic price, then the Basic price shall remain unaltered, meaning there will no claim on price escalation.

It is assumed that the Contractor shall use due diligence in procuring materials in required quantity at the right time and deliver the materials without causing unreasonable wastage. The burden falls on the Contractor subject to his liberty to procure materials from his own choice. The Employer also reserves the right to specify the source of procurement in some instances where the cost adjustment shall be made only on the prices of such materials purchased from sources as specified in the Contract. In the meantime, it is the duty of the Contractor to establish the basic prices against the specified materials under specified bill items forming part of the tender. Prices could be ex-factory, imported or open market as the case may be.

It is a pre-tender function of the consultant to compute the input proportions and list them in the tender document. The consultant should also check the authenticity of the escalation information formed by the Contractor as a post-contract function.

However, it is not in the best interest of a prudent Employer to ask tenderers to quote firm prices with no provision of adjustments, especially for long-term contracts. In bidding documents having provisions for price adjustment, the Employer is expected to receive more competitive offers from reputable parties and will have to meet the net variations in cost as may actually occur. Protocols are intended to make reasonable price adjustment in the billed amount, which by virtue of its being restricted to listed adjustable elements, is an approximation. Sometimes, this limitation has been connected with the contracts having contract price exceeding financial limit applicable for various Contractor registration categories. Contracts having value less than this limit may be considered as fixed price contracts.

In case of default on the part of the Contractor causing delay in original scheduled completion, the rate of price adjustment will be frozen at the original scheduled date of completion. However, the price adjustment will be payable in full for the extended period if the Contractor has been granted an extension of time for no fault on the part of the Contractor, duly approved by the Employer. Unless specifically stated otherwise in the contract, the basis for compensation will be only those elements, which are specifically listed as specified items in the tender documents. This list will specify the elements for civil, electrical, mechanical, services, etc separately on the principle of cost significance.

Financial compensation for the elements classified as above shall not be considered again due to provision of 'subsequent legislation', if separately specified in the contract. Also, there shall be no price adjustment for the elements which the Employer has either supplied free of cost or at fixed prices as well as for those elements for which an umbrella ex-gratia or escalation cover is provided by the Employer.

Parties should make provisions in the construction budget to cover construction cost fluctuation risks which may arise during the construction period. This is usually in form of a preliminary bill item where the Employer inserts a contingency allocation.

During the construction stage, when the cost of construction material exceeds the price range agreed by the parties, the following adjustment methods can be adopted: (a) weighted average method; (b) arithmetic average method; or (c) other methods as agreed by the parties.

In nutshell, many standard forms of contract provide a mechanism for contract price adjustment due to open market escalation in specified construction inputs such as major building materials, hire charges of plants, and wages for the labour. The choice of those inputs largely depends on the cost significance in the overall share for the quoted tender price. Therefore, the adjustments to the contract price shall be made in respect of not only in rise but also in fall in the cost of materials and other inputs affecting the cost of the execution of the works. Together with the traditional methods in calculating this escalated component using contemporary records, there are formula methods such as NEDO, Osborne, Baxter, Haylett, ICTAD to name a few. In all cases, the fluctuated component is ascertained on the difference between the indices of costs of construction labour and materials at the time of tendering and the current values of those indices at the time of escalation (in accordance with a predetermined relative proportion for each cost index). Although a formula method is fairly straightforward and simple to administer, it is difficult to introduce in countries where there is no promotional entity to publish construction indices acceptable as a single source authentic cost database for budgeting, estimating, bidding and cost validation. Since accurate input proportions and reliable cost indices are integral elements in such a mechanism, a traditional approach in an easy-to-understand manner, (by removing complications) helps in pursuit of a reasonably compensable amount. As such, the first task must be to lay down a couple of parameters. However, where the forces of supply and demand tolerate the price equilibrium, obligating the Contractor to procure materials from sources designated by the Employer is not only a gross intervention into Contractor's internal transactions which are commercial by nature but also an intervention in the supply chain. Remembering the theory of supply and demand as an organizing principle for explaining how prices coordinate the amounts produced and consumed, it applies to price and output determination for a market on the condition that no buyers or sellers large enough to have price-setting power. Market equilibrium occurs where quantity supplied equals quantity demanded, at a price below equilibrium, and when there is a shortage of quantity supplied compared to quantity demanded, it poses a price hike-up in the accredited sources more than in the open market. Demand-and-supply analysis can therefore be used to explain the behaviour of any type of market including construction which is obligopolistic in nature for many cost significant items. Interventions in the supply chain by a major construction client (contributing a considerable proportion of the gross domestic product through accreditation, for instance) means a serious concern because any large scale procurement through accredited sources can be detrimental in long run.

The foregoing is not only limited to Contractors but the consultants do face a similar destiny in their contracts. PSA which stands for Professional Services Agreement has been internationally adopted in the procurement of consultancy services. Typically, the contracts for professional services; be them design, supervision, quantity surveying or any other specialist service, include a project brief prepared by the Employer describing what he intends to obtain, meaning the scope of services. Usually, a clause in the memorandum of agreement sometimes states that "should there be any extension to the contract period, the consultant must continue the services at the same monthly rates and prices" so that it expressly forbids any fee adjustment in the contract and shall pass the pricing risk onto the consultants for an indefinite period of extension. This is totally unfair, because of the unforseeability on the circumstances that may render the existing rates inappropriate for an unexpected period of extension. Accordingly some action is important to establish a time limit beyond which the consultant becomes eligible for a rate revision. Optionally, the Engineer may treat each case individually by recommending rates compatible with the ongoing market prices only in the affected positions, using a database maintained in-house reliably.

A criteria is therefore important particularly when the professional service market is volatile in nature that prediction on the fee structures for longer periods is difficult, requests for the period is beyond the original completion date, reasons for extension is not in fault of the consultant, and when uninterrupted service is critical in a project nearing completion. Under above circumstances, a 'reasonable' compensation within a 'contractual' framework is imperative and is what parties generally prefer.

11.32 Changes in subsequent legislation

This clause is also not to be confused with the exception of those emanating from changes in legislation promulgated after the contract is made, such as a change in custom duty, for which a separate provision is usually provided in the contract. Any increase of minimum wage limit for labour due to the subsequent legislation is reimbursable on submission of satisfactory evidence. The payroll evidence of each subject employee is required with the actual amounts claimed, proof of employment on the particular project even if off site but on works directly related to the project and proof that claimed increases would not be subsumed, in whole or in part, by later payments in respect of bonuses, incremental increases, cost of living increases etc. Another example is when the government declare price increases in basic commodities such as fuel, and particularly diesel for most of the construction plants operate. A claim would follow on the basis of publicly gazetted declarations. However, the conditions allow for adjustment on net cost basis only. Any added mark-up is not acceptable since it can not be a windfall in business.

A change in subsequent legislation is generally a 'one time' escalation in a project life. As an example, many countries level headed their local oil prices to be compatible with the international oil prices, currency rates, especially for the Euro, and to address the imbalance in demand, supply and withdrawal of subsidies on agriculture and fisheries products, from exporting countries under the WTO (World Trade Organization) agreement. In overnight declaration by gazette, a more of a hike up in diesel prices by 43 per cent was recorded in some countries. As a result, on their own basis, construction Contractors started claiming adjustments to their contract prices under 'subsequent changes in legislation' clause. Conversely, the Employers started defending themselves by hiding behind 'price fluctuation' clause which stated that there will be no compensation due to market vacillations.

After series of allegations indulged over a period of six months or so, some governments recognized the impact on construction projects in particular and decided to work out a strategy to deal with such claims. Since there was no proper method has been agreed in advance as to how a reasonable compensation could be achieved, parties started adjusting their contract sums on ad-hoc basis.

Since the issue has been dictated by a gamut of technical and economic factors, some state agencies enhanced contract sums by a marginal percentage across the board. From strict quantity surveying point of view, it would have been a sieve analysis in search of 'actual losses' sustained by Contractors giving due reference to tender pricing level. One such method is to enhance the existing unit rates of the remaining bill items of work to be done (where diesel is necessary for execution) from the cut off date which diesel price actually increased, so that any previous work done as well as work items for which diesel is not consumed can be taken aside at the outset. A reasonable amount for the diesel component can be added back to site overhead, which may be 1-2% increase, depending on the intensiveness of the inputs. (meaning, labor intensive projects are the least affected). Another method would be to consider actual consumption on diesel based on plant deployment schedule, provided proper records can be maintained and authenticated at site level. The bottom line is that only the affected projects must be considered for compensation. Projects the tenders of which are currently being floated can be canceled and returned for re-submission, in order to secure competition for the Employers and commercial viability for the tenderers. Projects the award of which has been already made but not yet commenced can be taken up for a lump sum adjustment under preliminaries as a partial erosion of the contingency available. For on-going projects, only the affected items can be considered. These parameters must be set out in advance of further analysis.

11.33 Defending a claim

Often, a construction contract will contain a written notice provision governing claims. If a Contractor fails to give proper written notice of a claim, an Employer may assert this failure as a defence to the

Contractor's claim. However, a caution is taken whether the Contractor's failure to serve timely notice shall necessarily lose his right to lodge a claim at a later stage. The Contractor may of course lose his right to claim if notice is a condition precedent to lodge any claim.

The extension of time clause may require the Contractor to claim an extension of time within a specified period from the date that the cause of the delay arose. These contracts seek to prevent the Contractor from claiming an extension of time at all for a delay unless he claims within that specified time. These clauses must be sufficiently clear to be enforceable. However, even if the notification clause is not written as a condition precedent, Contractors must claim within the times specified in the contract. The failure to comply with timely notice as well as submission would be a reason for upfront denial. For instance, claims must be made say, within 21 days after occurrence of the event giving rise to such claim or within 21 days after the claimant first recognizes the condition giving rise to the claim, whichever is later. Claims must be made by written notice. However the terms as earliest as possible' and 'as soon as practicable' keep time frame little flexible.

An exculpatory clause such as a 'no damages for delay' clause may be used by an Employer to defend a delay claim brought by a Contractor. Enforcement of such exculpatory clauses varies depending on the jurisdiction, but the 'no damage for delay' clause generally is held to be valid and not contrary to public policy. An exculpatory clause releases a party from liability for its own wrongful acts or omissions. Even though "no damages for delay" clauses are enforced in some jurisdictions, they are at times disfavoured and strictly construed against those who seek their benefit.

In essence, an exculpatory clause converts an excusable/compensable impact into an excusable/non-compensable impact. For example, a sub Contractor on a one and one-half year project was denied recovery despite having alleged that it was delayed by two additional years as a result of the Contractor's poor coordination and abandonment of the work. Even though the delays were presumed to be unreasonable, the appellate Court held that a clause in the subcontract stating that the sub Contractor would be entitled to only a time extension in the event of delay was a clear expression of the parties' intention to bar delay damages.

'No damage for Delay' clause also prevents the Contractor from recovering damages, including extended site and home office overhead, for Employer-caused delay. The Contractor can only obtain a 'non-compensable' time extension. Courts have supported the use of this clause in private contracts.

However, some state public works codes such as the California Public Contract Code has disallowed the use of this clause when the delay is not contemplated at bid time by the parties or when the delay is unreasonable. While it can be argued whether the delay was contemplated or reasonable, generally the 'No Damage for Delay' clause has been unenforceable in public contracts in California. The California Code also prohibits any effort by the governing agency to require the Contractor to waive the Code's prohibition of this clause.

Notwithstanding the existence of a "no damages for delay" clause, many Courts allow for damages to be recovered for: (1) un-contemplated delays; (2) delays caused by the other party's bad faith or its wilful, malicious, or grossly negligent conduct; (3) delays so unreasonable that they constitute an intentional abandonment of the contract by the other party; and (4) delays resulting from the other party's breach of a fundamental obligation of the contract.

These exceptions are often narrowly construed. For instance, the fundamental breach of contract exception applies only for the breach of a fundamental, affirmative obligation the agreement expressly imposes upon the other party. For example, the Court in a recent case refused to bar a Contractor's delay damages under a no-damages-for-delay clause because, the Court held, the Employer breached an express duty to coordinate the work of its other prime Contractors. In a companion case, the same Court enforced a no-damages-for-delay clause where the Contractor alleged that the Employer breached an implied duty to coordinate the work of its other prime Contractors.

Similarly, the abandonment of the contract exception is limited to those situations where the contracting party is responsible for delays which are so unreasonable that they connote a relinquishment of the contract by the contracting party with the intention of never resuming it. The active interference exception applied to a sub Contractor's claim where the Contractor failed to coordinate the work of its other sub Contractors, directed the sub Contractor to perform piecemeal jobs, failed to require cleanup, improperly surveyed areas, failed to timely relocate utilities and failed to protect the sub Contractor's finished work.

The un-contemplated delay exception limits the application of an exculpatory clause to delays that (1) were reasonably foreseeable, (2) arise from the Contractor's work, or (3) are mentioned in the contract. For instance, a recent case held that the parties to a four month long rock excavation subcontract contemplated the excavation taking as long as eight months, but not that the Contractor would fail to provide surveyors to establish grade.

Prior Settlement Release and Waiver is another concern. A change order issued by an Employer and executed by a Contractor may result in a waiver of a future claim by the Contractor for the same event. Thus, the Employer should review any prior change orders that relate to a Contractor's claim.

If an Employer has not assumed the risk of a certain event, the Employer ordinarily is not liable for extra costs incurred by the Contractor as a result of such event. As a result, a Contractor may be entitled to a time extension but not be entitled to additional compensation from the Employer for extra costs resulting from the event for which the Employer did not assume risk. For example, a Contractor may be entitled to a schedule extension for delays caused by excessive adverse weather conditions but may not be entitled to recover additional costs arising from the delays if the Employer did not assume the risk of adverse weather. It would be arguable, however.

If a Contractor is bringing a claim against the Employer on a contract that has not been substantially or properly performed by the Contractor, the Employer may, in certain circumstances, be able to defend against a Contractor's action by asserting that the Contractor is in breach of the contract.

A Contractor that abandons its performance obligations under a contract may be in breach of contract. Whether such abandonment will constitute an absolute defence to a Contractor's recovery for work already performed will depend on many factors, including whether the contract can be divided into discrete segments. If a contract is divisible, then an Employer may be less able to assert abandonment as an absolute defence to a Contractor's claim for recovery based on work already performed on the contract.

The statute of limitations for contract actions varies by jurisdiction. It is possible that if a Contractor asserts a claim against the Employer based on facts occurring far enough in the past, an Employer may have a defence against the claim based on the applicable statute of limitations.

On occasion, a claim against an Employer may arise through no fault of the Employer. In some instances, when the fault lies with a third party acting as an agent or representative of the Employer, the Employer may be liable on the claim. However, in other situations, the Employer's contractual relationship with the third party may be such that the Employer is relieved of liability for the errors of the third party or for a Contractor's mistaken reliance on the authority of the third party.

The Contractor has an obligation to mitigate any damage that results from a problem on a construction project. Accordingly, an Employer may be able to defend against a claim in part by introducing evidence that the Contractor should have taken steps to mitigate the problem and thereby reduce the amount of damage incurred.

In extreme cases, when an Employer is presented with a claim for extra work that the Employer believes to be false or grossly misrepresented, an Employer may have an action against the Contractor for fraud.

Claims on global nature can also be denied upfront wherever it finds the causes of delay attributable on the part of the Contractor. Where the Defendant was not liable for all the causes, it can be followed that there was a need to apportion delay between specific events but which was precluded, by the format of the global claim, with effect that the claim must fail.

Finally and most importantly, the Engineer may return claim submissions whatever not justified with contemporary records in support. Contemporary records are that documentary evidence maintained at site level and authenticated by the Engineer that requires no further proof for a legitimate claim.

11.34 Evaluation of design changes

Where the Engineer instructs design changes then this is by an expressly termed direction to change or modify the type or method of construction or the materials for incorporation. The Engineers decision to put into effect a design change maybe as a consequence of either:

a. discovery of a defect or omission in the original design
b. the need to further improve the original design
c. a change or modification necessary due to some default of the Contractor and which is considered expedient as a satisfactory remedy?

Modifications or improvements on the existing design due to revision of the existing standards or codes of practice may establish a valid ground for time extension subject to considerations arising out of construction program. The Engineer may consider approval if the standard can still be met at no cost to contract in the event the Contractor proposes design changes for his own benefit without extending time for completion. Those benefits might include ease of work allowed on concessions.

A valid ground for time extension is again when the originally envisaged design is found to be impracticable in toto or in substitution of materials owing to unavailability of materials specified in the tender. The Engineer may also make due changes in the design in order to avoid outright condemnation or demolition of work done and to bring works back to technical compliance. Incomplete/inconsistent drawings; design errors/defects, omissions, changes in codes and regulations etc result in abortive work, waste of resources, plus rework of design and redrawing. Of these, the primary causes are Employer-initiated changes and designer's errors and omissions.

The impact of design changes needs to be evaluated case by case in order to assist with the judgement as to the amounts compensable or recoverable. Though some changes may bring in "benefits" to the Employer in long run, most changes, if not managed properly, will result in "negative" impacts, most likely resulting in time and cost overruns. In general, upper-stream changes have larger impacts.

It is important to establish a baseline in the tender itself so that changes can be comparable and quantifiable to some extent, particularly in lump sum contracts. A proposal to achieve this goal is to obtain two tender inputs; namely design intent and level of resources.

The design intent includes the design approaches, strategies, parameters, and hypothesis underlying the whole design effort on the originally envisaged scope. The level of resources is the type and number of expertise (e.g., architects, planners etc), number of man-hours and the rates under each stage (conceptual, preliminary, schematic, detail etc). Of course, this proposal is not all-fit-in method of evaluation, but would serve the purpose of measuring the cost on wasted or additional deployment on resources in evaluating a design change.

11.35 Pass through claims

A "pass-through" claim may be defined as a claim by a party who has suffered damages (in this case, a sub Contractor) against a responsible party with whom he has no contract (namely, an Employer), and which are presented through an intervening party who has a contractual relationship with both (namely, a Contractor).

The respective rights and obligations of both the Contractor and the sub Contractor, and the procedures for presenting a pass-through claim to an Employer, are often contained in a "pass-through agreement", which purports to allocate both the expenses incurred and the benefits derived when such a claim is advanced. Among other things, the terms of the agreement may provide specifics as to how the claim is to be presented to the Employer, and how the obligation to pay legal fees is to be shared. The agreement may also deal with authority and control issues relating to the conduct of the litigation, including decisions regarding appeals; may outline settlement rights and obligations; and may establish terms as to how and when any monies recovered from the Employer will be paid to the sub Contractor. Significantly, the agreement may also contain an acknowledgment of the sub Contractor's claim, and often contemplates a preliminary partial payment by the Contractor to the sub Contractor.

An Employer is alleged to have caused delays to a project (e.g., failure to properly manage the change order process; failure to respond to shop drawings and submittals in a timely fashion; etc.), or to have interfered with the co-ordination of the work (e.g., failure to provide timely and unrestricted access to the site; interference in the Contractor's work force or work plan; etc.). As a result, both the Contractor and the sub Contractor might each have incurred damages (e.g., extended home office overhead; extended insurance and bond coverage; additional salary for site personnel; etc.). Alternatively, the Contractor and the sub Contractor, in order to meet a tight construction schedule, might have been obliged to accelerate their work (e.g., by engaging additional labour forces, working overtime, etc.), in which case each of them may similarly incur damages. In these examples, the Contractor's independent claim for damages, and the separate damages incurred by the sub Contractor, may differ in terms of both measure and rationale. Any delay analysis and computation of damages would be further complicated if the Contractor or the sub Contractor contributed to the impact on the schedule. For example, notwithstanding the Employer's delays, the Contractor might have failed to properly coordinate his sub Contractors or the sub Contractor might have failed to plan for a foreseeable shortage of construction materials. This of course invites an inquiry as to how their involvement in the cause of the delay should affect their respective damage claims, and raises other issues of concurrent delays.

11.36 Claims reporting

Finally, it is important to follow a template for the reports on claims evaluation ended up at the Employer's premises in order to receive a consistency in the presentation, for the settlement purposes. More importantly, a template helps keep the writer's focus streamlined in a manner that stepping into valid and factual conclusions, without missing, duplicating or mixing the facts and figures hither and thither. However, since each case is unique, the claims analysts are not intended to strictly follow the template format all the time. A template will not only ease the analyst's own task but also help him convincing the material facts to a third party, often being the first time reader in the top level of management and who does not have much time to concentrate deep into the matters but who are supposed to take decisions on the assumptions that the report in front of him is comprehensive and reliable. A good template may follow the steps as follows;

1. Issue - with the tile in short and to the point, stating what is asking for or expecting?
2. Project status – using internal accounting records
3. Scenario - this part will carry background information of the issue – the history, previous references in chronological order, what is expected by the other and where the parties are 'standing' at the moment.
4. Contractor's position - this part explains in short the Contractor's main and subsidiary allegations against the Employer and Engineer. To be precise, this part explains why the Contractor asks for the time and/or cost, the basis, his approach, interpretation if any and the amounts.
5. Consultant's position - this part explains in short the consultant's (say, supervision Engineer and quantity surveyor) positions in terms of basis and method of calculation.
6. Engineer's position - this part explains in short the Engineer's thinking, any technical judgments, commitments or his silence etc.
7. Other positions - the report can have a space for any other representative if it had an involvement.
8. The Employer's position – this part is the most important portion of the report and usually a two third of the space will take for the following sub divisions.

a. Findings (other than the above)
b. Own arguments for and against the positions of the Contractor, Consultants, Engineer and the Others
c. Own approach, basis, strategy, defense and interpretation
d. Limitations - any restrictions to come up with safe and independent outcome.
e. Hypothesis – these are realistic assumptions made in order to arrive at conclusion or to analyze the issues
f. Eligibility – contractual or otherwise,
g. Quantum – the amount excusable and/or compensable,
h. Options available and their implications legally, commercially, contractually, and in public interests
i. Conclusion and/or
j. Recommendation
k. Appendix – calculations, graphs, tables etc

It is the recommendation that is always preferred in lieu of conclusion unless it signifies when the whole matter can be ever concluded from the Employer.

11.37 Summary

Claims are inevitable in construction projects. However, they are avoidable provided a proper mechanism has been employed at site level. A claim might have traffic in both ways; from the Contractor to the Employer and vice versa. Burden of proof lies on the party alleging the claim events. Once established eligibility, it is quantum that takes place on the principle of reliance cost or what is aptly called 'actual loss'. Claims analysis should also take a rational approach in order to simplify and streamline the whole process. The required chain of analysis is duty, breach, cause, effect and damage. This chain of analysis anticipates that the claiming party will fulfil each of the elements in order. Amongst the different types of claims, global claims are the most stringent type of claim since the issues have been inextricably intertwined at the project nearing completion where the causes and effects can not be easily dissected into the parties responsible for.

CHAPTER 12
CLAIMS - 2

12.1 Introduction

This chapter has been dedicated for claims related to time extension and prolongation costs. Various planning and time impact analysis methods, the issues connected with concurrent delays, float ownership and the recovery of head office overhead in a contract prolongation are the subject matters under detail discussion.

12.2 Planning

Construction planning involves the choice of tools and technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of interactions among the different work tasks. Although this is a reflection of a planner's mental process, construction planning is more of a scientific approach using computer aided sophistication in addition to intuition and thumb rules. As a top-down process, construction planning has a three tier step. Firstly, the bird's view on project requirements, secondly the decision on task and time frame and finally the logical sequence. Often, the projects are unique, heterogeneous and operate within time, cost and quality parameters so that no precedence is possible in planning. It is a collaborative effort, a forward looking exercise, having a forecasting component and the development of a construction plan is no exception to these characteristics.

12.2.1 Gantt chart

A Gantt chart is a matrix which lists on the vertical axis all the tasks to be performed. Each row contains a single task identification which usually consists of a number and name. The horizontal axis is headed by columns indicating estimated task duration, skill level needed to perform the task, and the name of the person assigned to the task, followed by one column for each period in the project's duration. Each period may be expressed in hours, days, weeks, months, and other time units. In some cases it may be necessary to label the period columns as period 1, period 2, and so on.

The graphics portion of the Gantt chart consists of a horizontal bar for each task connecting the period start and period ending columns. A set of markers is usually used to indicate estimated and actual start and end. Each bar on a separate line, and the name of each person assigned to the task is set on a separate line. In many cases when this type of project plan is used, a blank row is left between tasks. When the project is under way, this row is used to indicate progress, indicated by a second bar which starts in the period column when the task is actually started and continues until the task is actually completed. Comparison between estimated start and end and actual start and end should indicate project status on a task-by-task basis.

Variants to this method include a lower chart which shows personnel allocations on a person-by-person basis. For this section the vertical axis contains the number of people assigned to the project, and the columns indicating task duration are left blank, as is the column indicating person assigned. The graphics consists of the same bar notation as in the upper chart indicates that the person is working on a task. The value of this lower chart is evident when it shows slack time for the project personnel, that is, times when they are not actually working on any project.

Gantt charts have been extensively used in scheduling projects of different types; be it construction, assembly, installation, or even in managing a patient, perhaps because of the obvious advantages existing over the network based methods. Its versatility arises from its simplicity in its preparation and its use. Gantt charts alone are not always adequate for the preparation of work programs and the choice of technique depends on various circumstances though the information so obtained may be presented in a form of Gantt chart. The efficient use would certainly enhance its versatility. In this regard the issues discussed in the following sections will be useful to identify the relative merits in the application of Gantt charts over network based methods.

a. Gantt charts will be good enough in a construction project such as a house, extension of an existing building, or a similar work having typical and simple activities to be completed in a shorter duration.
b. Gantt charts have been widely used in war front military planning related to engineering activities. This is apparently due to three main factors that the users of the Gantt chart are non technical, locations of review are critical (no micro computer system on site) and the time is vital. Whenever the user or programmer is non technical, naturally bound by time, location and a limited level of interpretation in any given task; be it military or non military, Gantt charts serve better than network based methods.
c. Gantt chart is used to simplify the resultant activities of a network in order for the executors who are directly on the job to understand and use at the site level as an immediate tool of supervision. A need of a network chart does not arise if a 'rhythm' can be established overall in relation to operations and as long as it is understood by the user.
d. Very often the planned progress is shown merely by a time related bar. Time alone is meaningless and indication or measurement by units of money, man or machine hours may be misleading since these are not necessarily related to physical work planned on completion. It has no effect on rate of working envisaged. Hence, planned progress should be based on quantities of work. With this standard of comparison, a Gantt chart becomes extremely valuable. One of the advantages of this approach is its usefulness in calculating the resources required. Once the quantities of work to be done are known and phased out, the required manpower, sub Contractors, plant and equipment

as required and so on could be calculated with a purpose in relation to requirements for different periods.

e. Unlike network methods, Gantt charts provide basis for cash flow forecasting of the Contractor as well as the Employer in a given project. By assigning values derived from the priced bill of quantities onto the bar lines in a compatible manner, the Contractor and the Employer is able to forecast his cash in and out for budgetary allocation purposes from project inception to completion. Network methods do not facilitate cash flow forecasting in construction projects.

Perhaps, it is fair to say that, the use of Gantt charts for planning works is like attempting to drive a car with a blackened front windscreen. For instance, we anticipate many variation orders. Will a bar chart be sufficient to assess the impact of such variation orders? From time to time we come across many problems. We cannot really assess what happens 'if' something goes wrong and so on. Often, it leads to disputes and Gantt charts are inadequate to resolve these disputes effectively.

12.2.2 Critical path

Scheduling is an important tool in all sectors; be them construction, cinema, manufacturing or service industries; where a delay can have a major impact on the productivity of a process. In manufacturing, the purpose of scheduling is to minimize the production time and costs, by telling a production facility what to make, when, with which staff, and on which equipment. Similarly, scheduling in service industries, such as airlines and public transport, aims to maximize the efficiency of the operation and reduce costs. No construction is possible without scheduling.

Modern computerized scheduling tools greatly outperform older manual scheduling methods. This provides the production scheduler with powerful graphical interfaces which can be used to visually optimize real-time work loads in various stages of the production. For example, an airline might wish to minimize the number of airport gates required for its aircraft, in order to reduce costs, and scheduling software can allow the planners to see how this can be done, by analyzing time tables, aircraft usage, or the flow of passengers.

The Critical Path Method (CPM) is a network based project scheduling technique widely applied in civil construction, installations, and similar projects. It uses a linear time-cost trade off where each activity can be completed in less than its normal time by crashing the activity at a given cost. Thus if the normal project completion time seems to be unsatisfactory, certain activities can be crashed to complete the project in less time at greater cost. There is an optimum project duration time at the minimum total cost.

In a CPM chart, the critical path is indicated. A critical path consists of a set of dependent tasks (each dependent on the preceding one) which altogether take the longest time to complete. Although it is not normally done, a CPM chart can define multiple, equally critical paths. Tasks which fall on the critical path should receive special attention. The critical path for any given method may shift as the project progresses. This can happen when tasks are completed either behind or ahead of schedule, causing other tasks which may still be on schedule to fall on the new critical path (unless corrective action is timely taken). The approach (preparatory works such as work breakdown structures) in producing a CPM chart is basically similar to a PERT chart.

12.2.3 PERT method

Project evaluation and review technique (PERT) has been widely used in research and development related projects. It also depicts tasks, durations, and dependency starting with an initiation node from which the first task, or tasks, originates. If multiple tasks begin at the same time, they are all started from the node or branch, or fork out from the starting point. Each task is represented by a line which states its name or other identifier, its duration, the number of people assigned to it, and in some cases the initials of the personnel assigned. The other end of the task line is terminated by another node which identifies the start of another task, or the beginning of any slack time, that is, waiting time between tasks.

Each task is connected to its successor tasks in this manner forming a network of nodes and connecting lines. A PERT chart may have multiple parallel or interconnecting networks of tasks. If the scheduled project has milestones, checkpoints, or review points (all of which are highly recommended in any project schedule), the PERT chart will note that all tasks up to that point terminate at the review node. It should be noted at this point that the project review, approvals, user reviews, and so forth take time.

Many PERT charts terminate at the major review points, such as at the end of the analysis. Many organizations include funding reviews in the projects life cycle. Where this is the case, each chart terminates in the funding review node.

Often the PERT and CPM are spoken in the same breath. CPM, or Critical Path Method, too has the same mandate as PERT, though the focus of CPM is slightly different. The basic take-off stage in both CPM and PERT is to identify the activities required to complete the given project. A Gantt chart may be deployed to list the activities in a structured fashion, along with their interdependencies. This logically flows into the next stage, where a "network" of the activities and their dependencies is drawn up.

In both CPM and PERT, the time required to complete each activity is estimated. Now, while in CPM, a single point estimation of the completion time is sufficient; in PERT, the simplest form involves determining three estimates of the time required to complete each activity. In mathematical terms, activity times in CPM are taken to be "deterministic"; while in PERT, they are taken to be "probabilistic". This is where the differences begin between the two.

With each event are associated two important times

a. The earliest time TE, which is the calendar time when the event can occur if all the predecessor events reach their completion at earliest possible times.
b. The latest time TL, which is the latest time the event can occur without causing any delay in subsequent events, and without delaying the project's completion at all.

The slack time for the event is the difference between its latest and the earliest times. This is the upper limit that an event can be delayed, which if exceeded or crossed, shall surely delay the entire project. Activity time is the elapsed time required for an activity. The entire effort of PERT - indeed, its very raison d'être - is geared towards arriving at this activity time as accurately as possible. PERT takes the statistics route to do this.

Put simply, managers can give three time estimates for completion of every activity. These estimates are:

a. Optimistic time estimate (TOPT) - This is the minimum time period in which the activity can be accomplished, with the presumption that everything will proceed better than expected.
b. Most likely time estimate (TLIKELY) - If the manager were asked for, not three, but only one estimate, then this is the value that they would have given.
c. Pessimistic time estimate (TPESS) - This is the maximum time period required for an activity to be completed. From an inclement weather, to the prototype or design review being rejected for reworking all over again; managers can think of everything that can go wrong, when arriving at this value.

Of course, since PERT hinges on these three values, managers would do themselves a favour by giving as good guesstimates as they possibly can, in order for overall project estimation to be as accurate as possible. The three estimates together determine the probability distribution of the completion time on the critical path. In PERT, a few simplistic assumptions are made, for example, that the critical path, once identified earlier on in the game, does not change. However, it is possible that the critical path that was identified based on the most likely or expected completion time will not necessarily end up being the critical path. Scenarios in which another path takes longer than the identified critical path may be ignored. There might be a tendency to understate (it is quite human, after all) the expected completion time, and this will definitely underestimate the probability of late completion.

The best part about PERT is that it recognizes uncertainty in project time estimation as it is - there is no attempt to sweep it below the carpet, and pretend that it does not exist. On the contrary, PERT gives a rough approximation of the uncertainty in the final completion time. Of course, the simplifying assumptions made during the analysis do lead to an underestimation of the probability of long project completion times.

Both CPM and PERT applications basically;

a. reveal interdependencies of activities
b. reveal impact of late and early starts
c. reflect trade off between resources and time
d. indicate cost of a crash program
e. provide visibility to control 'one of a kind' programs
f. evaluate net effect of delay on project completion
g. provide means of monitoring progress
h. identify critical paths
i. aid in scheduling risk analysis

Unlike CPM, PERT clearly determines where the greatest effort should be made to keep a project on schedule and the probability of meeting deadlines by development of alternative plans (provided the decision maker is statistically sophisticated). PERT evaluates the effect of changes in the program for instance, the effect of contemplated shift of resources for the less critical activities to the activities identified as probable bottlenecks. PERT also can evaluate the effect of a deviation in the actual time required for an activity from what had been predicted. Finally, PERT allows a large amount of sophisticated data presented in a well organized diagram from which Contractors and customers can make joint decisions.

PERT is probabilistic in nature which allows us to calculate the risk in completing a project. CPM is based on a single time estimate and is deterministic in nature. PERT is used in research and development projects where the risk in calculating time duration has a high variability. CPM is used say; in construction projects that are resource dependant and based on approximate time estimates.

PERT is used in projects where a percent-completion calculation is not possible. Therefore, PERT is event oriented as well as end-item oriented rather than activity oriented. CPM on the other hand, is activity oriented and percent-complete along the line can be determined.

PERT might also face a problem of data access historically available to make predictions unless the project is repetitive. The question of data for CPM may not be so critical since CPM is based on previous data on recently completed similar projects.

12.3 Concurrent delays

Many theories abound as to what it really means and what implications are. The law is unsettled and there is little authoritative guidance to rely on. Those seeking to use concurrent delay as a contractual sword adopt a wide definition, whilst those using it as a contractual shield use a narrow definition. A Contractor may use concurrency to defend against a claim for liquidated damages, while the Employer to waive off the Contractor's pursuit of delay costs. Where concurrent delay does exist, the disagreement arises over the consequences for entitlement to extension of time, exposure to liquidated damages and recovery of prolongation costs. Standard forms are silent as far as concurrent delay is concerned. Consequently, there are principles that can be gleaned from case law.

12.3.1 *Wallace* decision[82]

In R.P. Wallace case, the Navy entered into a contract with Wallace to renovate a Naval Support Facility in New Orleans. As part of the contract, Wallace agreed to furnish and install specially designed windows consistent with the aesthetic characteristics of the existing facility, but sufficient to withstand winds up to 160 miles per hour. The Contractor was slow in starting work, so that several months into the project, a little progress was shown towards project completion. By that time, the Contractor was substantially behind on its delivery of the window submittal. When the window submittals were finally turned in, the Contractor and the Navy determined that the design requirements for the windows could not be met and the design needed to be changed. The changes were implemented; but the project was delayed, partly because of the changes to the windows and partly on the slow progress. The Contractor submitted a claim for release of the liquidated damages that were held against it, arguing that even though it may have been responsible for certain delays and the Employer's change in the design was a concurrent delay to any Contractor-caused delays, thus precluding the assessment of liquidated damages.

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[82] R.P. Wallace, Inc. v. U.S., 63 Fed. Cl. 402 (2004).

The Court first noted that the Contractor must prove that the excusable event proximately caused a delay to the overall completion of the contract, i.e., the delay affected activities on the critical path. The Court stated that the Contractor was entitled to only so much of a time extension as the excusable cause that actually delayed performance.

Concurrent delay occurs where the delay can be attributed simultaneously to the actions of both the Employer and the Contractor. Sequential delay, on the other hand, is based on delay events that occur at distinct and intermittent periods. The Court found that in the case of concurrent delay, the Contractor's delayed performance is excused but the Contractor is not entitled to an adjustment in the contract price. With sequential delay, however, the delay is apportioned and in fact apportionable between the Employer and the Contractor. Hence, the Court performed its own window analysis by evaluating select periods to determine who was responsible for the delay during each of those designated periods and how that delay affected the overall project completion. This typically requires a CPM schedule analysis to be able to allocate the delay between two parties during each of the selected periods.

The Wallace decision emphasizes the need for the parties to develop a realistic baseline schedule with updates at delay events. The reason for doing this is to address delay events as they occur. It also reveals that concurrent delays are two or more delays, one because of the Contractor and the other the Employer, the impact of which fall at the same time, and which is critical for completion once individual delay impacts are separately considered. Accordingly, where you have two competing causes of delay of equal or relative causative potency a natural response would be to suggest that the overrun and its consequences should be 'apportioned' between the Contractor and Employer on the basis to their relative causative potency. Although this would appear to be simple and reasonable, it has attracted little support in common law jurisdictions where there is a tendency to apply principles of causation in an 'all or nothing' way so that the claimant would either win or lose. Arguably the apportionment approach is dependant on the causative potency. But it may create difficulties over the split between time and cost.

12.3.2 But for test

The 'but for' test is based on a simple concept that the overrun would not have occurred 'but for' the Engineer's instruction, for instance. Legally, as a matter of the burden of persuasion, the burden is on the party claiming delay damages resulting from the delay to provide a reasonable basis for apportioning the effects of these concurrent delays between Employer and Contractor. If the concurrent delays are so intertwined not as easily separable, or the Contractor otherwise fails to provide a reasonable basis for apportionment, then the claim for delay damages may be found insufficient. This is because the claimant has effectively failed to demonstrate that the other parties' delay actually delayed project completion. Put in another way, where the effects of concurrent delays cannot be segregated, it cannot be said that "but for" the other party's delay, the contract could have been completed earlier.

Keating on Building Contracts defined concurrent delay as: 'It there are two causes, one the contractual responsibility of the Defendant and the other the contractual responsibility of the Plaintiff, the Plaintiff succeeds if he establishes that the cause for which the Defendant is responsible is the effective, dominant cause. Which cause is dominant is a question of fact, which is not solved by the mere point of order in time, but is to be decided by applying common sense standards. This rationale is based on the parties having intended that in the event of a delay one of them must be responsible. It anticipates for the Engineer to consider the reasons for the delays and pick up the 'dominant' one.

In fact, there may well be circumstances where a relevant event has an impact on the progress during a period of culpable delay if where that event would have been wholly avoided had the Contractor completed the works by the previously fixed completion date. For example, a storm which floods the site during a period of culpable delay and interrupts progress would have been avoided altogether if the Contractor had not overrun the completion date. In such a case it is hard to see that it would be fair and reasonable to postpone the completion date to extend the Contractor's time. However, in practice it could be impractical to apply when two causes have equal potency.

12.3.3 *Malmaison* approach[83]

'Malmaison' approach is considered to be the modern decision on concurrent delay. Malmaison was a hotel in the centre of Manchester, which experienced significant delays. Mr Justice Dyson said in passing 'if there are two concurrent delays, one which is a relevant event and the other not, then the Contractor is entitled to an extension of time for the period of delay caused by the relevant delay notwithstanding the concurrent effect of the other event.' If the contract suffered a delay of a week because of exceptional weather, a Relevant Event and the same period of delay because of the shortage of labour, not a Relevant Event. Then if the architect feels it fair and reasonable to do so, he should grant an extension of time and he cannot refuse to grant one on the grounds that the delay would have occurred anyway because of the shortage of labour.

Basically, the Contractor cannot recover delay damages where it cannot segregate the Employer's delays from its own. Similarly, the Employer cannot enforce a claim for delay damages due to Contractor delays that are not segregated from the Employer own delays. Accordingly, the rule generally is that when concurrent delays cannot be segregated, neither party may recover damages for the resulting project delays. In effect, concurrent delays are treated as if 'excusable' but not 'compensable'.

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[83] Henry Boot Construction (UK) Limited -v- Malmaison Hotel (Manchester) Ltd TCC (1999)

A tendency is that a common sense resolution is the best that can be achieved and that depends upon the merits and facts of an individual case. Where true concurrent delay does exist, a common sense approach should be taken up. However in many contracts the tendency is to excuse the Contractor from the period having concurrent impacts at no cost to contract, allowing loss to lie where it prevails.

It is important also to consider what the SCL protocol says. The protocol aims to provide an agreed manner in which issues of concurrency can be resolved. Where an event of Employer Risk and Contractor Risk occur at the same time, the Contractor should nevertheless be entitled to an EOT for the delay to completion. Risk events which occur sequentially, but the effects are concurrent, should also not reduce the amount of an EOT due to the Contractor as a result of Employer Delay.

The protocol's position on concurrency prevents an Employer taking advantage of the Contractor's delay after the contract completion date to issue instructions and make changes without giving an EOT. That is, if the Employer's new instructions further extend the period of the works and the Contract Completion Date that delay will be concurrent.

The protocol has no application of 'dominant' cause theory, which is frequently adopted in other local guidelines to determine whether a Contractor should be entitled to an EOT in circumstances of concurrent events of delay. Given that disputes often arise due to conflicting arguments over cause of or contribution to delay the protocol attempts to move away from the apportionment of blame for the delay. However, the protocol is in one sense Contractor friendly in adopting the position that the Contractor gets an EOT notwithstanding concurrent Contractor delay. This is a position which has been adopted in the recent case of Malmaison hotel as mentioned earlier.

There is some balance in that the Contractor must still prove that he has incurred additional costs as a consequence of the Employer delay, beyond costs due to the Contractor's concurrent cause of delay before the Contractor is entitled to compensation notwithstanding that there may be an entitlement to an extension of time.

12.3.4 When Contractor's delay depends on Employer's delay

The case of *Stewart v. Keteltas*[84] involved construction of a building in Manhattan. The specific details of the delay events were unclear, but it appeared that at least some of the Contractor's delays occurred in parallel with some delay events attributable by the trade Contractors separately hired by the Employer. The Contractor contended that its work was "so connected with that of others employed by the (Employer) upon the building that at times its progress necessarily depended upon that of the other work, and that in consequence of delays, they were prevented from completing their work within the time limited in the contract." Essentially, the Contractor argued on the concurrency.

The Stewart Court found that "there can be no question but that hindrances by the Employer, rendering it impossible for the Contractor to fulfil its obligations, would afford a legal excuse for their non-performance." In considering the Employer's argument, the Stewart Court held "that the Contractor is not to be excused for delays caused by the Employer unless they rendered it impossible to complete the contract work within the stipulated time".

The Court decided that, by conduct "the Employer thus released the Contractor from all claims he might have had against it for breach of the contract" so that the Employer cannot recover for a Contractor's delay if it itself is causing or contributing to the delay. Simply speaking, the Employer has a duty not to hinder the progress of the Contractor.

12.3.5 Jefferson hotel

The Jefferson Hotel Co. v. Brumbaugh case involved the construction of the Jefferson Hotel in Richmond, Virginia. The Contractor was bound to build the hotel by a date certain, "excepting delays caused by the Employer". At the end of the Contractor's work, the Employer imposed liquidated damages at the rate of $150 per day. In contrast, the Contractor argued that its work was largely dependent upon the material suppliers and independent Contractors of the Employer and they were the source of delay. In turn, the Employer argued the "Contractor was responsible for the longest period of delay and the Employer for only a few of the days, and that the Court, under such circumstances, should attempt to 'apportion' the blame between the two and hold the Contractor liable in penalty for those days that it, in its judgment, deems he may be chargeable with." In essence, the Employer sought segregation of liability and apportionment of damages.

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[84] Stewart v. Keteltas, 36 N.Y. 388, 1867 WL 6457 (1867)

The Jefferson Court stated that this is just what the Courts cannot do with any degree of certainty. It needs a more practical approach on site operations to realize the actions and inactions in a given context and their sequence, and associated implications. For instance a Contractor may not complete the woodwork until the plastering is done; he may not in many instances complete the cement work until the plumbing is placed; It could not be required of him to move his scaffolding, his tools and implements, and his workmen back and forth from one end to another just as the other Contractors might complete in one side a part of the ductwork in another part the plumbing, and in still another the marble work, in order that he should be free from the charge of delay. Courts cannot know of these conditions as they actually existed at the time, and the evidence would be very unsatisfactory. This is wholly a question of simulation from details that are scattered and vague. Therefore the Courts have laid down a very salutary rule to the effect that they will not attempt to apportion such delays where the causes have been mutual, but will refuse under such circumstances to enforce the penalty.

Accordingly, there were two big lessons learnt in the Jefferson case. Firstly, a Contractor should not be required to rush to work around Employer interruptions in order to avoid delay, a defence that has become a keystone of acceleration claims. Secondly, the Court's reluctance to parse through competing delay claims as an evidentiary matter. That is, Court's unwillingness to resolve this complex dispute, particularly in apportioning delays, after the fact. The essence is that the parties failed to provide sufficient evidence to allow the Court to apportion the competing delay claims, and, even if they could do so, the judicial policy is to not perform such an apportionment as a matter of law.

12.3.6 Concurrent arguments

It was a construction of a cruiser for the navy[85]. In review of the facts, the Court found that 396 days of delay were caused: "(1) by delay arising from numerous changes in plans and specifications, (2) by delay of the Contractor in preparing and furnishing for approval drawings and plans, (3) by the inability of the Contractor to obtain structural material from the manufacturers, (4) by bad weather, and (5) by the temporary suspension of work by Contractor's employees. All these delay causes took place more or less concurrently during the period in which the work was performed.

One extreme is that the Contractor simply cannot recover on its delay claims from the government, as it contributed to the delays itself. The Newport News decision is that if the Employer had any contribution to the delay, it could not recover liquidated damages and the Contractor's contribution to the delay has the effect of barring its delay claims.

The concept of concurrent delay therefore appears to have been confused over time with the Employer's implicit obligation not to hinder its Contractor. Certainly, such an implicit duty exists, but the question remains as to how such a duty relates to concurrent delay and whether and how the two concepts can be taken together. If the Employer hinders its Contractor, it may have breached a contractual duty to the Contractor for which the Contractor is entitled to relief in terms of time and/or cost. However, it does not necessarily follow that hindrance of the Employer should be a controlling factor in how competing delay claims are resolved. A rule would be to restrict the application of concurrent delay to those situations where the Employer has reached its implicit duty not to hinder.

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[85] Newport News Shipbuilding Co. v. EEOC, 462669 (1983)

It can be safely said that the doctrine of concurrent delay stems in large part from the Court's unwillingness to apportion delay where the facts are complex and there is at least some liability on both sides. This unwillingness is itself based on the plaintiff's failure to adequately prove their claims. This policy creates an incentive for delaying parties to frame the dispute as one of concurrent delay so as to avoid judicial scrutiny of the actual facts involved. Further, such a policy might result in unfairness on the contracting parties as they are often precluded from attempting to partially resolve disputes through concepts such as liquidated damages while also being precluded from having the Court perform the job of apportioning delay, even where the contract dictates. However, CPM analysis and other methods of apportioning and explaining construction delays are versatile in which concurrent impacts can be at least approximately established in terms of number of calendar delays.

Accordingly, the continued application of this doctrine is for the disgruntling parties to see that justice prevails. When applied to complex, accumulated and intertwined multi-party disputes, the doctrine of concurrent delay would definitely mean many things. It should however reflect the economic reality of the underlying contractual relationships and is why CPM analysis, in efforts to look at alleged concurrent delays more closely and apportion damages, must be undertaken where possible at all times.

The SCL protocol recommends that a Contractor should be entitled to compensation for prolongation for concurrent events that cause it delay, if the Contractor can prove that its losses result from Employer's delay. However, if a Employer risk event and a Contractor risk event have a concurrent effect, the Contractor will not be entitled to recover compensation unless separate loss and or expense flows from the Employer risk event, such as the period by which the Employer delay exceeds the duration of the Contractor delay. Under circumstances, each specific case of concurrent delay should be viewed on its own merit.

Arguments rivalled around concurrency are many. Of them, a couple of conflicts of interests amongst the delay analysts are as follows;

a. Concurrency is where the effects of individual causes of delay events, some for Contractor's fault and some for Employer's fault, prevail at the same period of time. To be more precise, concurrent effects mean sequential delay impacts attributable by both parties due to events which when taken each event independently affects critically on the scheduled completion. So, it is imperative to identify each individual delay event and see both the 'occurring period and the extent' of its impact and judge the criticality involved. This is called 'causative potency' in strict contractual jargon, usually detected in forensic delay analysis.

b. Concurrent impacts are excusable for considering time extension.

c. Neither party can recover cost damages from the other party for the period of concurrent delay. Where there are consecutive events, the first of which, in time, is culpable and causes a delay, the second of which is compensable and, but for the earlier cause, would have caused the same delay, the Contractor does not get extension since it can not be said that the second event delayed the completion date.

d. Where there are consecutive events the first of which in time are culpable, and cause a delay, the second of which is compensable and causes further delay beyond that caused by the earlier culpable event, the Contractor gets extension only in respect of additional delay caused by the compensable event.

e. There should be a strong valid reason for recommending any additional cost on extension that involves concurrent effects. This is possible only if it is able to separately identify the additional costs caused by the Employer delay from those caused by the Contractor delays. This may be difficult if not impossible since the causes have often been inextricably intertwined.

f. The Employer shall take the benefit of relying on his own delay that is subsequent to the delay event responsible by the Contractor, unless the Contractor establishes that the subsequent delay event caused by others, when he was ready

> to commence or continue the delayed works, so that he was prevented completion or recovery of delayed works.

Many contracts require a TIA to include an analysis of concurrent delays because they consider concurrent delay days as excusable but non-compensable. This is a give and take policy that shares pains and gains. TIA findings help identifying the concurrent elements so that the prolongation cost can be treated accordingly. Since concurrent impacts are known to be non compensable, it is difficult to expect those elements in the Contractor's submission. A prudent planner on the Employer's side must take them account for an equitable time analysis.

In nutshell, TIA models actual performance using computer-generated schedules developed during the currency of the project at periodic intervals, adding specific activities (fragnets) that model delay impacts occurring during that interval. The result of the addition of these activities may change the completion date for the project as well as the critical path. This new impacted schedule is then updated with actual progress for the next period and the process is repeated. The goal of this methodology is to model the actual events on the project as accurately as possible and through that modelling, identify on a periodic basis the critical path, the delay or acceleration on a periodic basis, concurrency and the party responsible for delay. It results in both eligibility and quantum.

12.4 Use of float

It is the Contractor who decides the methods of construction, sequence of activities, deployment of resources and allowances for risks such as weather, all of which finally reflecting in the Contractor's program. The program is an estimate of how works might proceed based on the Contractor's chosen methods. The Contractor alone takes the risk that it has underestimated the time needed and should also alone benefit from any contingencies that have been built in as float. On one view, therefore is that where a Contractor has carefully arranged his affairs (or 'husbanded' his time) so as to make certain activities non-critical, then delays which are caused to the Contractor, for which the Contract provides an extension of time, should result in an extension of time (thereby, in fact, giving the Contractor even more time 'up his sleeve'). The opposite view is that the Contractor, where delayed on a non-critical activity, should not be entitled to an extension of time because he will not, in fact, be delayed under the Contract.

Float is a buffer time allowed for any unforeseen delays that inhibit the Contractor from meeting the completion date. The Contractor shall comply with the contract program and has the benefit of any float incorporated into it. Extensions of time should be judged on their merit and given accordingly, irrespective of any unused float. If the Contractor is on schedule and has unused float entitlements it is possible to still apply for and receive extension of time. The Contractor should not be deprived of the benefit of such time saving in the program.

The SCL protocol insists that neither party exclusively owns the float and that it is available to whomever uses it first in which case the Contractor will become due for time extension for Employer's delays once the float has been fully exhausted only. The mere fact that the Employer's risk events prevented the Contractor from completing earlier than the contractual completion date and thereby takes away the float, should not be regarded as giving rise to an extension. Accordingly, if the Employer uses it, the Contractor will not be compensated, either by the return of the float or by payment of extra cost.

Where there is remaining float in the programme at the time of an Employer Risk Event, an EOT should only be granted to the extent that the Employer Delay is predicted to reduce to below zero the total float on the activity paths affected by the Employer Delay.

If as a result of an Employer's delay, the Contractor is prevented from completing the works by the Contractor's planned completion date (being a date earlier than the contract completion date), the Contractor should in principle be entitled to be paid the costs directly caused by the Employer Delay, notwithstanding that there is no delay to the contract completion date (and therefore no entitlement to an EOT), provided also that at the time they enter into the contract, the Employer is aware of the Contractor's intention to complete the works prior to the contract completion date, and that intention is realistic and achievable.

The protocol describes float as 'the amount of time by which an activity or group of activities may be shifted in time without causing delay to a contract completion date'. It strongly recommends that ownership of the float, which may ultimately determine entitlement to an EOT as a consequence of the Employer's delay, should be adequately addressed in the contract. The protocol recommends that the contracting parties address both the issues of the relationship between float and an entitlement to an EOT and the entitlement to compensation for loss of float even where there is no entitlement to an EOT to avoid uncertainty in such circumstances. Float is not usually dealt with in standard form contracts, and the Protocol sensibly aims to overcome this.

Additional works are often a source of time extension provided there is no float to absorb within the existing program. Float is a buffer time allowed in the program as envisaged by the Contractor at the time of tender but whoever the first uses it in a delay may get the benefit of available float. This means the remaining float belongs to the project, as a principle. Omitted works on the other hand is not a cause to reverse the time for completion, unless the parties mutually agree. However, the effect on omitted works, if they are substantial, will and should alone have a minus effect on the contract completion.

12.5 Time impact analysis

Contracts require the injured party to petition, in form of a claim, for a time extension, if they have been delayed by the actions or inactions of the other party. To this goal, many contracts specify that a time impact analysis (TIA) be prepared and submitted to objectively substantiate the request for a time extension. Once the duration of time has been agreed upon then the added time-related costs of such a delay are ascertained. Prolongation cost means a replacement value paid back to the losing party by bringing him into the original position financially had there been no delay occurred. Cost is not necessarily a function of time. Hence a prolongation cost claim should reflect what actually sustained monetarily due to delay in question, instead of time extension. No party should unjustly enrich in the pursuit of prolongation costs.

TIA can be both prospective and retrospective. It is prospective when parties look forward to establish a future date as the new date for completion. It is a time forecast designed to facilitate a timely contract adjustment prior to the actual work being completely preformed. It is retrospective whenever historical delay events have been accumulated and inextricably intertwined so that parties have no choice but to assess it with the available means to establish a date in either past or future tense.

In both cases, the purpose is to avoid time becoming at large. If time extension is not granted, as many would agree, and of course well settled and confirmed in case law, the Contractor's liability of completion extends to a reasonable period of time. Time extension secures therefore the Employer's right to impose liquidated damages or penalty, as the case may be.

12.5.1 Baseline

A Contractor proceeds into work with an approved program, as usually called the clause 14 program (as it is tied with traditional clause 14 in many standard forms). The correct term is Baseline program which shows how the Contractor intends to execute the said works in terms of start and duration of each activity and their relationship (logic), together with any technical or legal constraints in the site process or the user imposed restraints such as a partial taking over date or a milestone completion.

With all, the Contractor has the liberty to organize his own resource allocations, site operations, material procurements etc, etc as long as he can safely accomplish the scheduled completion or any other milestone completions. It is the Contractor's prerogative to decide on the durations, logic, etc as long as they are not fundamentally erroneous from strict planning point of view. A minor error in calculations and unrealistic assignments here and there would not be minded by the Engineer in the approval. In fact, the Engineer's approval does not relieve the Contractor's obligation to maintain a reasonable rate of progress. Approval of a Baseline program is therefore a bird's view appreciation but it should not mean to prevent the Contractor either in contractual commencement or completion, once the parties have entered into the contract.

Many argue that baseline program must receive the recognition similar to a contract document. Whether it theoretically forms part of the contract is a question of rather academic than practical. Only the major constituents must be binding the parties. These essentially include commencement date, completion date, and milestones if any and not exactly the duration, logic or sequence. This is because any program is a project management tool belonging not only to the Contractor but also the Employer in a living dynamic site environment. Simply, it is everyone's program subject to hundreds of changes a day. Parties have to adjust the program because they can not adjust the eventualities. Making a program a contractual tool rather than a technical tool will definitely restrict everyone in a chaos, by very nature of construction. Program belongs to the project, therefore.

12.5.2 Revised programs

It is a contractual obligation for the Contractor to submit revised programs as and when required. However, submission of monthly updates to reflect the actual progress against the planned progress is mandatory by contract and customary by practice. Maintaining a set of timely, accepted, schedule updates is very important to the delay analysis just because out of sight out of mind. The Engineer in all cases evaluates these updates and authenticates the accuracy of events and their impacts in his approval process. The question is what is to approve? It is the factual infrastructure the Engineer has to look into. The program should reflect the full scope of the work. For a trouble free analysis, the activities should be small in scope with relatively short durations, clearly reflecting their logical relationships between activities and groups of activities. There should be a continuous critical path without gaps from the first activity to the last activity. All activities except the first and last, should have predecessors and successors.

Internal schedule constraints should be logically driven, not fixed in time.

The term Baseline goes away with these updates that provide the basis of comparison in a delay analysis. Of course, a delay in site possession may well be compared against the available Baseline program and the possible result is the shift of the entire schedule as a bunch in one-go making a new scheduled completion date right at the beginning.

In larger projects with more activities and more changes during performance, a single update is completely inappropriate. This is a case of a typical road project where a hundred of activities running in parallel, over a period of several years, with around hundred varied works. There could also be cases for instance in a concourse building project in an airport having five thousand varied works, under forty nominated sub Contractors, over a period of five years. There are, however, instances in which a single baseline may be appropriate such as if the project is of relatively short duration with relatively few activities. If accurate data is available, as-planned vs as-built method is fair enough on a monthly basis, which is sometimes called a 'windows' approach, where the fragnets in software play no role.

12.5.3 Time to market while reserving rights

The SCL protocol recommends that the time adjustment be made quickly, using a method appropriate to the actual delay scenario. The whole idea behind this recommendation would be to avoid blurring the true history as the time lapses. Also, a delay in approval of a time impact analysis (TIA) may result in a supplemental claim by the Contractor of constructive acceleration. At some point, delay in preparation and/or approval of a TIA so diminishes the value of the analysis that calls for a more detail, yet difficult, forensic analysis. This is why the conditions of contract require the Contractor to submit together with the interim payment application, or what is aptly called the monthly statement, detail particulars of claims, as he deems eligible for additional time and/or cost. These details once submitted after authenticated by the Engineer at site level turn out to be valid materials for a legitimate claim, as they become contemporary in nature. However, the Contractor must have preserved his rights to lodge claims such as notice requirements when they are condition precedent. Contractors lose their rights when conditions precedent requirements are not mistakenly or otherwise abided by.

Claims that are submitted with the chronology of events will help understand the prevalence but claims are always one sided. Therefore, any claim that are storey type alleging that the Employer is responsible without backups in support may in no doubt be subject to upfront denial. Also, a review of a time extension claim without allegations on records on the other party is so insensible in that the net resultant delay is a gross exaggeration that never reflects time extension 'due under the contract'.

Contractors sometimes lodge their claims on interim basis. It is the Contractor's choice as they deem strategic. Conditions of contract do not restrict the Contractor to lodge any number of claims at any time. In fact, there may be many claims on the same subject since the effects are continuing. Once effects cease, a final claim would follow. However, the practice of 'splitting the baby' into many claims applicable within the same period of concern is confusing simply because the effects once evaluated and established can not be reversed in the contract to take account of another delay event on the same period. .

12.5.4Modelling delay effects

TIA is typically associated with the modelling of the delay effects. It uses Critical Path Method (CPM) schedule that is able to show the difference between a schedule that does not include a delay and one that does include an activity modelling the delay event. The variance in project completion, between the non-impacted schedule and that of the schedule with the impact, is considered to be the impact of the delay for time duration considerations.

Planners prepare a schedule fragnet in the pursuit of this variance. A fragnet consists of a subset of the activities in the project schedule that will be involved directly with the delay. For easy review, the delay is termed as simply as possible by using the fewest number of activities and relationships in order to substantially reflect the impact of the delay to the schedule. However, care should be taken to correctly define the change or impact and the logical insertion into the fragnet. Existing activities and logic should be left intact whenever possible except to incorporate the fragnet. Added relationships may cause some of the existing relationships redundant to the CPM calculation, but relationships should only be deleted when the retention of that relationship negates the actual work restraints on the project. Redundant relationships caused by the additional inserted logic should be left in the schedule wherever possible and should not affect the overall result. It is acceptable to add a delay as a successor to an activity when in fact, that delay occurred during the activity and delayed its completion. It is also acceptable to split the existing delayed activity into two activities, with one representing the portion of the planned work to be performed before the delay, and the other portion of the planned work after the delay, as long as the combined durations of the split activities equals the original duration of that activity. This is where the art of planning comes into play even by a Contractor to internally evaluate his alternatives to regain or improve project completion in his own delays.

12.5.5 Just prior to actual delay

There are conditions under which a time impact analysis operates. It is the most recently accepted schedule update, just prior to the actual delay, correctly portrays the project status. TIA assumes that the Contractor's and Employer's responses to that delay are independent of the rest of the project. In effect, a TIA assumes that the CPM schedule at the time of the delay is 'frozen' and will not change anything other than the change brought about by the delay.

As stated, the baseline schedule should be used if the delay began prior to the first schedule update. If the time interval between the start of the delay and the last accepted schedule update is too great, the Contractor must elect to first provide a new schedule status and update with a status date immediately prior to the start of the delay. This pilot task is imperative before assigning any delay element.

An automated TIA is only valid if the CPM software, being used to model the effects of a delay event, properly shows the effects of the CPM calculations. This includes the consideration of a status date, out-of-sequence progress, and actual activity status. The schedule should not allow any un-started activity to be scheduled prior to the status date. Also, it should not allow for a prediction of early completion for an unfinished activity prior to the status date. Works actually performed on activities that are not logically able to begin can be revisited as long as they have no actual starts or actual finishes later than the status date. Once updated, an accepted CPM schedule, with a status date immediately just prior to the delaying event, must be developed that has no reference to the delay in question.

12.5.6 Fragnet business

A fragnet is a fragment of a CPM logic diagram, having many characteristics. It contains one or more activities or events with a positive duration. Those activities are logically connected to each other; and the fragnet as a whole is logically connected into the project schedule by creating a logic tie to a predecessor activity and a successor activity.

Using the accepted fragnet as a template, the planner can add the impacted activities and their logic. Planner should make the accepted activity adjustments to the existing activities as necessary to mirror the fragnet and set the duration of the delay activities to zero and recalculate the CPM. At this point in the analysis, all computed and actual dates in the original schedule update should match that from the original schedule update. If all dates do not match, then the fragnet insertion must be corrected until they do match.

In order to ensure TIA accuracy, it is important to often develop fragnets for every change order proposal on the project. Such a policy assures in advance the likely time implications on the remainder of the project. Since many Contractors have a policy to develop change order proposals for every conceivable event not clearly within the contract scope, there can be, and often are, hundreds of fragnets. Further, these fragnets can, in and of themselves, be relatively complicated since they will mimic the changes in scope. However, it should be noted that most of these variations all along a typical construction project will have no impact on the completion of the project. This is why there should be a guard against strategic manipulations over the fragnets in terms of inclusions, exclusions, illogical connections and unrealistic durations.

Of these, the most fundamental decision an analyst makes is the decision to include or exclude a fragnet. For example, a planner for an Employer could choose not to include one or more fragnets under a theory that his expertise concluded it could not possibly have had an impact. Alternatively, a planner working on behalf of a Contractor could include every event conceivable fragnet to mimic the events. He might even divide a single event into multiple fragnets, possibly magnifying its effect. In either case, the planner controls the outcome through his preconceived decisions. Another possibility is the number and type of logic connections the analyst employs. For example, if an Employer were to decide to install a different air condition split unit after the original one had been installed, what is the planner's approach to develop the fragnet whether is it actually happened or should have happened?

Using the original schedule update, planner can determine when the successor activity to the delay impact actually became a project critical activity. On schedules without negative float, the activity will be predicted to become project critical on the computed late start date. The first date of delay due to this impact will be the next day after the activity late start date. For original update schedules that do show negative float, the start or delay date will simply be the first day of the delay event. Every day after this start of delay will be labelled a counting down delay day until the number of delay days is exhausted. The above course of action assumes that project float belongs to the party who uses it first. It also assumes that the project does not meet all legal requirements for a declared early project completion.

12.5.7 Quantifying mitigation

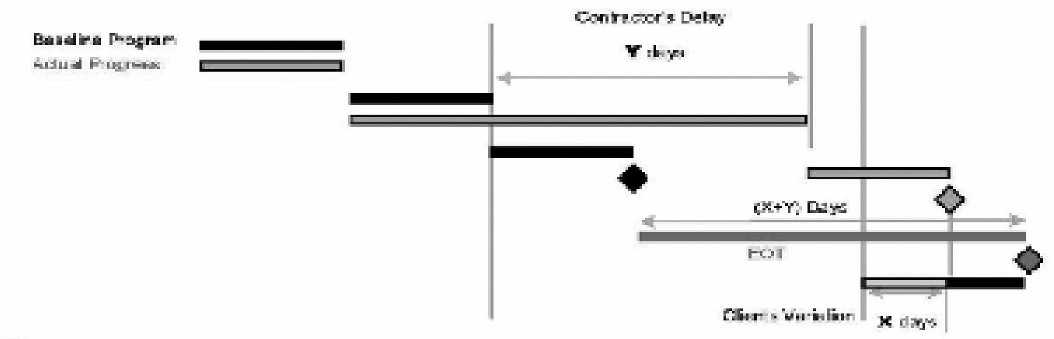
Contracts require that the Contractor mitigates effects of any delay to the extent practicable. If the delay time period involved is long, or if substantial mitigation of the delay has occurred, then the effect of such mitigation matters. This is imperative if mitigation efforts by either the Employer or Contractor have modified the actual impact of a delay on project completion. There must be a correlation between calculated and actual for a proposed TIA to be acceptable.

However a planner may ignore quantifying mitigation in a frozen work plan, forward-looking impact analysis, and negligible duration of the delay. In lieu of actually redesigning the logic, that was in effect when the delay occurred, to that which was actually used after the delay occurred, the Contractor may elect to revise the remaining duration status of every activity in the schedule to the remaining duration status evidenced at the time of the actual end of the delay. This revision of the status to the impacted schedule will reflect the resultant effects of mitigation of the project. Activities performed out-of-sequence will still exist as successors to the impacted activity, but their remaining durations will be reduced to reflect the work performed during the delay period.

12.5.8 Reconciling the delay effects

If a project is in a delay for which there is no entitlement of time extension and an Employer causes a further delay after the contractually scheduled date for completion by lately issuing a variation, it has been accepted that the Contractor's entitlement is assessed on the "net" method, and not the "gross" method.

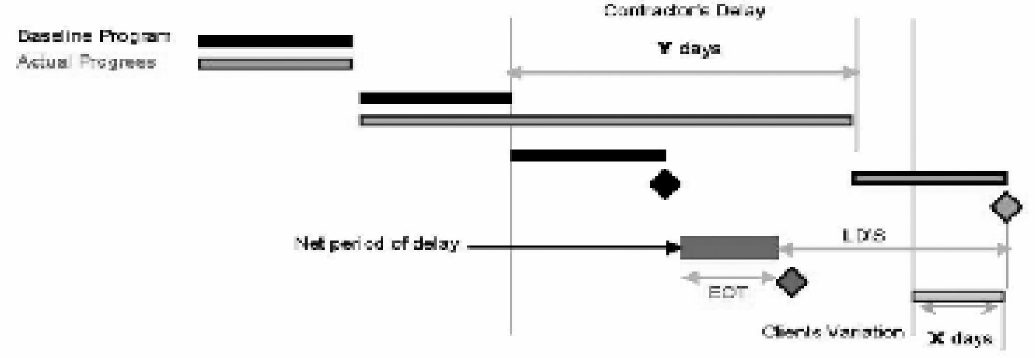
In the gross method, any extension of time will be granted regardless of the Contractor's own delays on the presumption that the client's delays have effectively prevented him from carrying out his original program of works. Neither parties delay has any greater importance in this assessment as shown below.



- There is a delay due to Client's Variation
- EOT = Extended Contractors completion date

The above graph clearly depicts that the EOT has been granted to the total duration of delay by adding the gross delay (Contractor's delay + Client's delay/or duration for the varied work) to the scheduled or extended completion date. This gives an absolute excuse to the Contractor from his own delays during the period under liquidated damages (see the next graph for clarity). In other words this gives the Contractor a relief from his liabilities towards the delay in completion, in which the client is prevented from deducting liquidated damages.

However the client will get a benefit of extending the Contractor's defects liability equivalent to the period under suspended damages. The net method was adopted in many Court cases[86].



- There is a delay due to Client's Variation during a culpable delay by Contractor
- EOT = Extended Contractors completion date

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[86] Balfour Beatty Building Ltd. Vs Chestermount Properties Ltd [1993] 32 ConLR 139

The Chestermount case confirms that where a delaying event qualifying for an extension of time occurs during a period in which the Contractor is already in culpable delay, a 'net' extension of time shall be granted so that the contract completion date is extended by a period comparable to additional delay caused by the event. In this particular case, the Contractor unsuccessfully argued that the new completion date should be fixed at a time after the occurrence of the delaying event, regardless of the existing culpable delay. The court refused to apply the prevention principal and insisted apportioning the blame.

Accordingly, the Contractor will get an EOT for a net period of delay and be paid for additional cost on prolongation as per the contract. The Contractor is liable for liquidated damages for the period in between the extended contract duration and the practical completion date. More importantly this will secure the rights of the client from recovering the damages through LD provision. The Contractor will also have to bear the consequential losses. In nutshell, the net method is in line with the principle of good faith and fair dealing, common sense and with the SCL protocol.

12.6 Delay impact analysis methods

Not all delay impacts result in a critical delay to the project's scheduled completion. Therefore, it becomes necessary to determine which delays were critical and which were not. In order to determine the net time impact, all delay events, whether alleged or not by the Contractor, must be assessed against industry recognized and accepted methodologies. Generally, time extensions are based upon the Contractor's demonstration that a particular delay event or a series of events had a critical impact contributing to the project's overall completion. Therefore, non-critical delaying events never provide a basis for entitlement to any time extension. It is only when the impacts are fallen on a program can one say whether a particular activity became critical. Accordingly, the critical path at the baseline program never exists but continuously changing over the passage of time. How to identify the impact in terms of calendar days requires the correct choice amongst the many methods available.

Everyone starts with as-planed vs. as-built method in comparing the durations of the planned activities with the as-built durations. The entitlement is the variance between the planned construction period and the as-built construction period. This method helps identify the activities that have gone particularly wrong and critical. Because this method requires as-built information it can only be used for retrospective delay analysis. It therefore assumes that the as-built situation arises by reason of variations or other reasons for which the Contractor is entitled to an extension of time and not due to its own culpability. 'Own culpability' is a matter for the Employer to intentionally dig out, in that case.

Clearly it requires the planned program and as-built information in sufficient detail to compare as-built activities with the same planned activities. To do so, assumes that the planned program was realistic and achievable, the work was appropriately resourced to enable that plan to be achieved and that the only reason for the delay was because of an event for which the Contractor is entitled to an extension of time. The as-planned vs. as-built method works on these assumptions.

As-planned vs. as-built therefore involves a simple comparison of the Contractor's planned program as to how he intended to execute the works with the actual events. This is done by drawing bars on the planned program that shows when the activities actually started and finished. The entitlement shows by the difference of these two programs so that there is no need to have a properly logic linked program. It does not however identify who is at fault, it does not demonstrate cause and effect, it takes into account of the Contractors culpable delays and it can only be used retrospectively.

Impacted as-planned method involves inserting activities and constraints to represent periods of excusable delay in to the Contractor's planned program. The periods of delay are logically linked to activities in the program to determine the impact on progress and completion. It predicts the likely impact. The entitlement is the difference between the as-planned program and the impacted as-planned program.

This technique relies upon having a good baseline program that accurately reflects the intended method of execution. It doesn't require as-built records. It tends to give results more favourable to the Contractors. When there are multiple causes of delay with the wide ranging impacts, this technique fails as it takes no account on the progress of works, Contractor's own delays, and adjustments in the level of resources and changes to program logic.

The as-built but for method involves taking aside the effects of delay events from the as-built program in order to assess how the work would have progressed in the absence of delays. First, a dynamic as-built program is produced using planning software to create a model of the timing and sequence of actual events. The model must precisely replicate how the works were executed using as built start dates, finish dates and activity durations with appropriate logic links between activities. The second stage involves identifying the delay events in the as-built program and apportioning them to the party responsible for them. The delay events are shown in the as-built program either as activities or constraints. Their impacts are modelled by creating logic links between the delay events and subsequent activities. The third stage involves removing the delays from the as built program to show how the works would have constructed but for the delay. In claims for time extension, only the delays for which the Contractor is not responsible are removed. The entitlement is the difference between the respective completing dates of the full as-built program and the as-built but for program.

Several iterations are therefore required to ensure that the model represents what would have happened but for the delays. This involves adjusting the level of detail, logic and durations of activities. This technique therefore heavily depends on an accurate as-built program. This technique is fact based and less theoretical than other methods and the results will however be wrong if culpable delays, re-sequencing, re-distributing of resources are not seriously considered.

Time impact analysis is the next method that determines the impact to delay events on the Contractor's intentions for the remaining works, taking into account the actual progress at the time the delay events occurred. The first step is to verify the Contractor's planned program and correct any errors. The second step is to identify delay events and periods. Next the actual progress of works at the start of the first delay event is input into the Contractor's program to check whether the completion would have been delayed by the Contractor's rate of progress. Activities representing the delay are then added to the program, which is then re-analyzed, and any further delay is recorded. The 'further delay' is the Contractor's entitlement at the time the delay events occurred. This process is then repeated for each delay event against a planned program that truly reflects the Contractor's method of executing the work. It also requires reliable and consistent progress data at small intervals to make the analysis meaningful.

The issue of apportionment becomes complex when there is a domino effect. Domino or knock-on effect suggests that some change, small in itself, will cause a similar change nearby, which then will cause another change, and so on in linear sequence. A delay caused on one activity may cause delays in the next series of activities. A common mistake made by many Contractors when attempting to demonstrate the cause and effect of an event is that they merely list in chronological order the pertinent exchanges of correspondence between the parties. This is usually insufficient to satisfy the burden of proof. To demonstrate cause and effect, a chronicle should be prepared based on the facts describing the effects of the event upon the works. This should include details of the planned works affected, referring to the planned sequence, durations, and methodology; the status of the works in relation to that planned at the time of the event; and, description of the changes to that plan as a consequence of the event.

Ultimately, the choice of delay analysis methodology will be dependent upon such matters as level of records available, the robustness of the baseline program and any updates, time available, degree of accuracy; and, more over the level of proof. Documentary evidence (letters, method statements, instructions, progress reports and photos, minutes of meetings, programmers and schedules), statements of fact and expert witness statements (if required) are the materials in support of the assertions made within the claim submission.

It will always be the case to have differing opinions as to the progress of the works achieved at the time of the delay, the construction logic of the works going forward at the time, as well as the mitigation measures that were or were not put in place, when any outstanding extension of time entitlements are looked at retrospectively.

What matters then are basically, the records and the planner's approach? Records of the Contractor alone will not help at all. Planners approach without Quantity Surveyor's input also will not lend a hand. TIA is a combined exercise. Quantity Surveyor is to guide the Planner in picking up delay events eligible under the contract and the Planner is to guide the Quantity Surveyor in picking up the concurrent elements and so on. A checklist approach will help make sure every important aspect has been taken into account. A checklist neither takes precedence over contracts nor frames out the planning or surveying expertise but promotes good practice in absence of a protocol in some organizations to deal with claims that involve time.

12.7 Prolongation costs

Claim on prolongation costs may not necessarily come together with the claim for time extension. Once an extension of time has been granted, the evaluation of the additional prolongation costs is often related to the period between the contract completion date and the extended completion date. Prolongation cost is also calculated on time related preliminaries. This line of thinking is illogical.

The intention of most construction contracts is for the Contractor to be reimbursed the additional cost which results from Employer delays. It involves a comparison between the actual costs incurred and what the cost would have been had no delay occurred. Where, for example, time is lost awaiting details which causes a two weeks delay to the critical path, evaluating the prolongation costs associated with the extra two weeks on site, following the revised contract completion date, may not produce the correct answer. A more accurate evaluation would be achieved by reference to the costs incurred during the two weeks when the information was late in arriving. It is wholly a question of cause and effect.

The SCL protocol, with regard to this matter, states that 'the recoverable prolongation compensation is to be assessed by reference to the period in which the effect of the Employer Event Risk was felt.' It is clearly intended that, once it is established that additional payment is due for prolongation resulting from Employer delays, the evaluation should relate to the period when the effect of the delay occurs and not to the overrun period at the end of the contract.

The period to be priced for the delay has been contested in Courts. Should it be the period when the delay actually occurred or the extended period at the end of the Contract? It is a question of cause and effect. There is little doubt that what must be priced is the effect of the delay, and it boils down to a clear and careful analysis of the effects of the delay to ascertain the additional overhead resources which are incurred. Perhaps, one would argue that it is only if, and when, the project as a whole is extended or prolonged beyond its programmed completion period as a result of the delay to the progress of the structure that the Contractor would be involved in the extra employment of resources over and above that allowed in the contract price. Of course, certain resources could have been extended within the original contract period as a result of variations and those extended resources should, of course, be reimbursed to the Contractor.

If the party (A) suffers a loss which he is entitled to compensation from the party (B) causing the 'injury' (for example a delay), the damages are to put (A) back into the position he was nominally in before the event. Hence, prolongation costs shall be the costs that actually incurred at the period the delay events impacted on the progress, instead of the period of extension. What must be priced is the effect of the delay, and it boils down to a clear analysis of the effects of the delay to ascertain the additional overhead resources which are incurred. It is only if, and when, the project as a whole is extended or prolonged beyond its programmed completion period as a result of the delay to the progress of works that the Contractor would be involved in the extra employment of resources over and above that allowed in the Contract Price. However, that certain resources could also be extended within the original contract period as a result of variations and those extended resources should, of course, be reimbursed to the Contractor.

Traditionally, prolongation costs had been priced by reference to preliminaries. The elements of fixed costs are usually only incurred once and not affected by a delay to the project; that element ought not to be claimed. The time related costs will, unless there is a full suspension of the site for instance, continue through any period of delay and can be claimed 'at cost'. 'Cost' will be calculated in accordance with the terms of the contract. However as the safe bet initially is to adopt the time related charge levels in the originally accepted bid, which is simple in approach that any one would prefer to adopt. However, during the 1980s this traditional basis fell into doubt, and that following various cases, standard forms of contract started to insist on the actual loss and expense incurred as a consequence of the Employer's delay, may be because of the concerns as follows;

a. Rates quoted for preliminary items could be time, method or activity related or even in doubt as to what category a particular preliminary item would belong to, such as grouting as the tunnelling proceeds or dewatering in off shore cofferdam or wet blanketing in a dam defect whenever priced under preliminaries.
b. They are forecasted values quoted in competition. They are values that the Contractor thought might happen rather than actually happened.
c. They may have subjected to any pricing strategies such as front end loading, back end loading, or that gives maximum return at completion.
d. Rates quoted for preliminary items, similar to other unit rates, contain a profit element. Actual costs should exclude profit. A party should not profit from another's loss out of eventualities beyond control of either party, say in a prolongation due to adverse inclement weather. This is in line with the principle of good faith and fair dealing.
e. The philosophy behind the compensation is to find the replacement value in order to bring back the Contractor into the original position where he stood financially had there be no delay.
f. The impact due to prolongation may also depend on the site involvement. For instance, the actual costs on preliminaries at the beginning and end of the progress along with the S-curve may be not as big as in the peak. The amount of additional

burden taken over by a prudent Contractor varies with the period as-impacted.

g. A contract may well have many hundreds of variations, and many dozens of these could be critical and contributing to the delay. Pro-rated preliminaries may duplicate the amounts for variations individually priced under variation clause. If a variation causes standing time (say in shotcreting in rock stabilization), then the Contractor may successfully recover the costs of that standing time as a variation even if it could be shown that the Contractor had no alternative work in any event and would suffer no loss from his idle resources.

h. Concurrent delays are excusable but not compensable, as a principle.

i. In contracts of civil engineering nature such as mass excavation in a borrow pit, dredging work or in demolition, more than 90% of the cost would be on plant utilization, priced in a unit rate, say in a rate per m3, apart from preliminary items. Payment on time related basis would be wholly inapplicable when such a contract is prolonged.

j. Time extension due to suspension of whole of the works or delay in site possession (that pushes ahead the planned program as a bunch) may not necessarily cost the preliminaries in full. It may sometimes cost more than what is catered for in the preliminaries.

k. As there is usually a short ad-hoc preliminaries bill, the use of the prelims bill for pricing prolongation is not complete in a sense. For instance, the items under preliminary bill are set out in line with the conditions of contract and specifications (as guided for instance in the Principles of Measurement International 1979). Some items are neither measurable nor priceable.

l. Tender price break up is usually subservient to the contract once obtained after the contract has been let and any particular inclusion or exclusion does not bind the parties in a prolongation issue.

m. The intricacy of the issues when they are inextricably intertwined has made more difficult in using preliminaries as the basis of prolongation costs.

Unless of course the contract specifically states, the parties may to the last resort decide paying the Contractor the additional cost on site overheads that are reasonably mounted up along with the prolongation. The author suggests the following formula in the recovery of site overheads in case they are not absorbed while valuing varied works that caused time extension. The assumption is that the Contractor's price for preliminaries is essentially related to the original scope of work so that the costs in preliminaries shall proportionately vary with any increase or decrease of the work volume.

$$\frac{\mathrm{SOH\ X\ (100 - P)\ X\ (EOT - PCI)}}{\mathrm{OCP}}\ \mathrm{X}\ \frac{\mathrm{WDEP}}{\mathrm{MW}}$$

where,

SOH	time related site over heads taken from the total value of preliminaries in the priced bill of quantities after taking aside any pay item on head office overheads, activity related preliminary item, method related charges and any other fixed sums.
P	profit component the Contractor has allowed in pricing the preliminaries
EOT	extension of time granted
PCI	period of concurrent impact over the excusable delay granted
WDEP	work done during the extended period (works valued against the bills of measured works including those omitted and varied works)
OCP	original contract period
MW	original value of the measured works in the priced bill of quantities

Overheads may be recovered in both payment for variations and in the pricing of prolongation costs. This is premised on the basis that the overheads in the B/Q rate should not be adjusted where the variation may cause a critical delay when it would not be adjusted if the variation has not caused delay. To deduct this allowance in the B/Q rate because the Contractor has incurred a delay would place the Contractor in a worse position than it would have been absent any delay. Usually, the overheads in the B/Q rates which are used to price variations are not adjusted. However, it is the loss and expense which is adjusted, not the B/Q rate. Not to do so would mean that the Contractor would be paid twice for some element of his additional overheads.

Hence, it is important to look at the entire scenario from a broad perspective. Since preliminaries are not 'expenditure properly incurred or to be incurred', the actual expenditure needs to be determined. This would eventually include time-related preliminary items, (for instance, the costs to be incurred in keeping the performance bond and insurance on extra premium) shall also be payable to the Contractor.

Also, the term 'actual loss' is more sensible than the term 'actual cost' for clarity. The Contractor should be entitled only for the actual loss and not the actual cost (in other words, the difference between the actual cost incurred in delay and the cost that would have incurred under normal circumstances as planned for which the contract rates are inclusive of basic cost, overhead and profit). The sum so arrived will eventually cover up any escalated component in prices of materials and labour and any loss of productivity. This will avoid possible over-compensation. All the cost items shall only be defensible with site records and other documentary evidence. The extent of entitlement and then the quantum has to be decided on the foregoing principles.

In nutshell, it is eligibility that follows quantum. The use of preliminaries on pro-rata basis would not truly result the actual loss in prolongation. The level of compensation is what is reasonable in the circumstances. Each case shall be evaluated on its own merit. If the cost difference can be seen as being not too remote from the original event it may be recoverable. The industry has accepted that the correct means of evaluating prolongation costs is by reference to actual expenditure, justifiable upon contemporary records.

Unless otherwise the parties have taken on board by contract the risk of pro-rata application of time related preliminaries, any method that is capable of finding the actual loss is admissible and the answer is 'it depends on the issues' where the expertise of the quantity surveyor triumphs. Seldom does one size fit all.

It is in the interest of the Contractor to present his most favourable claim on his own basis. Therefore in the first instance, an entitlement within the contract should be shown, stated and proved. The practical problems that beset the Contractor are that the potential loss and expense situations must be identified, established, quantified and valued. Furthermore, it should be in a form which must convince the other party to accept the claim as valid and that the integral parts are claimable and are correctly valued. But surprisingly, there are cases where the Engineer himself intervenes in claims submission on behalf of the Contractor, or keeping the Contractor's submission aside. This is not only a gross misunderstanding but a serious breach of ethics on the part of the Engineer to assume that he has the power to make his own assessment when the Contractor delays in submission or disagrees with the Engineer's opinion.

The recoverability of compensation for prolongation depends on the terms of the contract and the event of delay that caused prolongation, depending on whether the event is at the risk of the Contractor or Employer. A Contractor must demonstrate that it has suffered loss and/or expense before it becomes entitled to compensation unless the contract states otherwise. An agreed contractual amount per day for prolongation costs can reduce arguments over the proof of such loss which is a form of reverse liquidated damages.

The SCL protocol suggests that if a Contractor has made no or inadequate allowance for site overheads in its tender, it is not necessarily disentitled to compensation for prolongation and or disruption on the basis of recovery of actual costs incurred. For compensation based on actual loss and or expense, the tender allowances will not be relevant. However, the tender allowances may be a useful reference point for the valuation of prolongation and disruption caused by a variation, and could be used by the parties as a rough guide for the agreement of such costs to assess the value of varied work if that is what the parties wish to do. (Appendix E provides an example)

12.8 Valuing prolongation caused by variations

Where delay was caused by variation orders, these variations were almost always priced at B/Q rates without any allowance for prolongation costs. The reference to "direct loss and / or expense" in the standard phrase was thought to include prolongation costs. In building contracts, preliminaries have been set out fully in the opening section of the B/Q, and that traditionally, prolongation costs had been priced by reference to these preliminaries. This obviously gave the result that the valuation of prolongation costs could be either high or low depending on the pricing of the preliminaries by the Contractor.

A contract may well have many hundreds of variations, and many dozens of these could be critical and contributing to the delay having concurrent impacts. To assess prolongation costs by individually pricing each variation which causes critical delay is, for many contracts, simply not practical. Also, in a short preliminaries bill, this is not conducive at all. All these have prompted a move away from the traditional approach towards an actual cost basis for prolongation costs. When this traditional basis fell into doubt, industry has accepted that the correct means of evaluating prolongation costs is by reference to actual expenditure, but it depends on the precise terms of the particular contract.

For instance, overheads in the bill rate should not be adjusted where the variation may cause a critical delay when it would not be adjusted if the variation has not caused delay. To deduct this allowance in the bill rate because the Contractor has incurred a delay would place the Engineer in a difficult position than it would have been absent any delay.

However, the Employer cannot profit from liquidated damages during a period of the Contractor's culpable delay if the Employer has also prevented completion. Similarly, the Contractor cannot recover damages in respect of an extension of time if he has caused concurrent delay. The argument is that even in the event of a concurrent delay for which the Contractor is responsible, if the Contractor is delayed during that period by a variation then the Contractor should be paid for that prolongation necessitated by the variation.

It is normal to assess prolongation at cost, but to extend the detailed preliminaries rates provided in the B/Q may cause injustice for the Contractors who can establish his actual costs on contemporary records.

12.9 Liquidated damages

Liquidated damages, LDs are commonly defined as when a Contractor agrees to pay an Employer a fixed sum, either expressed as a percentage of the contract price or a fixed amount per day of delay in completing agreed upon milestones or project completion dates. The term liquidated implies that the parties have expressly stipulated in the contract the damage amount to be recovered in the event of a delay, regardless of the actual damages incurred by the Employer for the delay.

LDs are a benefit to the Employer in that they provide a strong incentive for the Contractor to complete its work in a timely manner. The purpose of liquidating or stipulating the damages is to fix the amount to be paid in the event of delay, thereby avoiding the need for the Employer to prove with certainty its actual costs incurred due to delay. Most construction contracts indicate that the liquidated amount to be paid should not be construed as a penalty, but as a good faith estimate of the actual damages that will probably ensue from the delay. Then, what is not intended in LD? LDs are not intended to be a revenue stream to the Employer for recovering project cost overruns and should not be intended to recover money from a Contractor unless that Contractor contributes to the project's delay by its actions or inactions. Additionally, LDs are not intended to be a penalty for the failure to complete on time, but rather a reasonable approximation of the damages the Employer estimates it will incur due to Contractor-caused delays.

12.10 No harm no foul theory

Assume the Employer wishes to construct a natural gas fired power plant and has decided to place two parallel prime contracts. The power plant Contractor is responsible for building the combined cycle power plant, while the pipeline Contractor is responsible for installing the natural gas pipeline that will supply gas to the project. What happens if the pipeline Contractor is nine (9) months late in completing the natural gas pipeline, through no fault of the power plant Contractor? At the same time, the power plant Contractor was one (1) month late in completing the power plant but the plant sat idle for 8 months waiting for the pipeline Contractor to complete the pipeline to supply the gas necessary to start up the power plant. Is the Employer entitled to recover LDs from the power plant Contractor for the one (1) month of delay?

Many construction contracts would allow the Employer to assess the power plant Contractor with one (1) month of LDs, as the power plant Contractor was indeed late through no fault of the Employer or the pipeline Contractor. Does this seem fair considering that the Employer could not have started the power plant due to the pipeline Contractor's delay? In other words, the Employer would have still incurred delay damages due to the pipeline Contractor's delay, even if the power plant Contractor had completed on time.

An equity argument can be made in this case that the Employer could not have started the plant even if the power plant Contractor had completed on time due to a lack of natural gas resulting from the pipeline Contractor's delay. Therefore, an equity argument can be made that the Employer may not be entitled to recover damages from the power plant Contractor because, through no fault of the power plant Contractor, the Employer would not have been able to start the facility and sell electricity. Using this argument, there is no reason to penalize the power plant Contractor. The Employer would regardless have suffered delay damages due to the pipeline Contractor.

Notwithstanding anything to the contrary elsewhere in the contract or in law, the Employer and Contractor agree that no liquidated damages for delay shall become due and payable by Contractor to Employer unless the Employer could have completed the facility and started receiving beneficial use of said facility but for Contractor's delay. This no harm - no foul philosophy is similar to the theory of concurrent delay, which is recognized by the Courts. In concurrent delay, performance is delayed by causes attributed to both the Contractor and the Employer, thus neither party can recover compensation for the delay, unless clearly dissected the portion of blame in each effect.

12.11 Assumed risk in exchange of waiver

Another recent case involving a paving contract required completion of the paving work before a certain date because the Employer did not want the Contractor placing concrete during cold weather. The Contractor's performance was delayed by unusual weather during the summer months, which entitled the Contractor to a time extension but not an increase in the contract price. However, the time extension would have required the Contractor to re-mobilize in the spring to complete the work due to the seasonal deadline. Rather than request a time extension, the Contractor agreed to assume the risk of any surface defects in the asphalt resulting from cold weather paving in exchange for a waiver of the season-related deadline. The road buckled the next spring allegedly as a result of the cold weather paving. Because the Contractor failed to repair the buckled road within the contract time, plus extensions, the Employer withheld liquidated damages. The Contractor sued for final payment, alleging that the delays were excused. The Court held that the delays were not excused because the Contractor had assumed the risk of surface defects in exchange for allowing the paving to continue beyond the seasonal deadline.

12.12 Unabsorbed head office overheads

It is generally accepted on principle that the Contractor shall be compensated any unabsorbed or under absorbed overhead component in a delay beyond his control. When construction is delayed by Employer-caused actions, it is fair to make an equitable adjustment to the contract in terms of cost and time.

Various formulae have been devised the application of which is widely tested in Courts of law. The essentials of a valid claim for recovery of unabsorbed overhead due to Employer caused delay can be derived from reading a number of Court cases. The Courts insist that the Contractor shall;

a. be entitled to recover when there is pure Employer-caused delay. (work stoppages due to design defects, suspension caused by a resolution of force majuere, slow responses to requests of information, etc)
b. demonstrate a clear cause and effect relationship between the Employer caused delay and a substantial reduction in the stream of income from the project, for instance a drop in turnover shown from accounts, which results from the particular delay in question, and not from extraneous causes.
c. justify that it was impracticable to take on new work during the delay period to mitigate likely damages in advance, for instance by showing invitation to tender with evidence that the reason the Contractor declined was insufficient capacity.
d. show that the delay was not the result of directed changes or contract modifications on variation orders (which will be compensated elsewhere through application of contract rates which include overhead and profit)

The agreement on causes of delay, its extent and cost impact is questionable partly due to existence of several formulae, which give widely varying results even when applied to the same fact setting. Each formula has its own limitations and hypotheses.

Also, some Courts have concluded that the Engineer directives to remain on standby or ready to resume on short notice preclude the Contractor from seeking new work to replace lost income. Interim disruption of work, exhaustion of Contractor's bonding capacity, uncertainty of duration of delay, equipment committed on the project are some of factors that may cause the Contractor unable to mitigate delay impacts. (Appendix F provides a comparison of formula methods).

Remoteness of damages ghosts everywhere. Even with the availability of many formula methods, it is difficult, if not impossible, to accurately measure any under absorption of head office overheads whenever the damages become too remote and speculative. However, the Contractor's entitlement as to claim for additional overhead costs has been confirmed in case law. But the burden of proof to demonstrate such lost opportunity entirely lies with the Contractor. If the Contractor is unable to show evidence to support this proposition, the claim would have to be based on actual costs through a proper delay impact analysis with the contemporary records in support.

A Contractor's overheads are normally covered by the income of the business as a whole. Where the completion of one contract has been prolonged, the Contractor may well be having a claim on loss arising from the diminution of the income from the contract but the general running costs of his business continue to be expended. Were it not for the delay, the Contractor's workforce would have had the opportunity of being employed on another contract, with the result that it would have contributed towards the overhead costs during the overrun period.

Contractor project costs are usually grouped either as "direct costs" or "indirect costs." Direct costs include labour, material and equipment installed as part of the work, and construction tools and equipment, all of which are charged to specific construction tasks. Indirect costs are those that cannot be identified with a specific construction activity but support the project as a whole, as, for example, costs of the project site management staff and the site office. Some indirect costs are one-time costs, e.g. setting up the job trailer, and others are time-related, e.g. the monthly rental cost for the job trailer or salaries for the project site management.

Home office overheads (HOOH) are generally described as company costs incurred by the Contractor in all projects in progress. These are costs that cannot be directly allocated to a project. This definition excludes those costs incurred by the Contractor solely in support of a single project. Typical examples of HOOH include executive and administrative salaries, legal and accounting expenses, rent and expenses, marketing, sales and advertising, company insurance, recruiting costs, utilities, interests on company borrowings, travel for home office staff, bad debt, depreciation of company assets, entertainment, bid costs etc. However, the Contractor's claim is a mix of site and head office overheads.

Lastly, Employer and Contractor should examine what costs are included in overhead claims. Are the costs reasonable and allowable? To be recoverable, overhead costs must be reasonable and incurred in the normal course of managing a construction project or a contracting business. The Federal government will audit the Contractor and deny overhead costs that are specious or specifically excluded by the Federal Acquisition Regulations (FAR's). For example, the audit of a Contractor making a claim against the U.S. Postal Service rejected the Contractor's recreational vehicle as an unacceptable business overhead expense. On another claim, a school district audit rejected the Contractor's bonuses paid at the end of the fiscal year, since they were a distribution of profit and not a home office overhead cost. Bad debts, contributions, entertainment, fines, losses, advertising and other specific costs are excluded by the FAR's from the recoverable home office overhead pool. Also, one-time costs should be excluded from the "daily rate" calculations, since daily rates should only include time-related, continuing costs. One-time overhead costs attributable to the claim should be claimed separately from time-related overhead costs.

Contractors are reasonably free to account for such costs in whatever manner they choose. They must however use the same system at all times and on all contracts. In performing such cost analysis, one must also guard against the possibility of 'double dipping' (accounting for the same costs twice). In defending, the Contractor may use tender price break-up in showing how his overheads have been distributed along with the pay items. However, tender price break up is usually subservient to the contract once obtained after the contract has been let and any particular inclusion or exclusion does not bind the parties in a prolongation issue.

A prudent Contractor can not be expected to spread their overhead and profit uniformly across all pay items in the contract. However, when a Contractor accomplishes pay-item work, they recapture both the cost of the work and the overhead and profit allocated to that work.

The Contractor is only entitled to recover damages when there is pure Employer-caused delay and must also result in a substantial reduction in project cash flow. The Contractor must show a reduction in the stream of income available to offset HOOH costs. (for example, a suspension of work order or a differing site condition resulting in stopped work.) The Contractor must show they were unable to take on new work due to unknown duration of delay and were unable to perform other work on this project to support HOOH costs. The classic argument is that if the Contractor does not know the duration of the delay at the outset (unknown period rule); they are in no position to contract for new work. The Contractor must show the Employer required them to remain on standby, ready to resume work quickly once the problem was resolved.

The Contractor must also show that the project delay did not result from directed changes or modifications and demonstrate the cause and effect relationship between the Employer-caused delay and the reduction in the stream of income from the project. That is, if a delay occurs but project cash flow is not substantially reduced, then no unabsorbed HOOH can be recovered.

Home office overhead costs are usually posted to accounts that are not project related, and lumped together, they are called the home office overhead "pool". The question remains: What portion of the home office overhead pool is used to support a specific job? The pool may be apportioned or allocated among the various jobs using some basis, e.g. based on the percent of total revenue contributed by each project or on the percent of total labour used by each project. Accordingly, a Contractor may seek reimbursement of its head office costs in one of two alternative ways: as lost opportunity costs or as additional overheads actually expended as a result of the delay.

12.12.1 Opportunity costs approach

An opportunity costs claim is based on the premise that because of the delay the Contractor's organization is free unable to move on to another project and earn the combined profit and head office overheads of which it is reasonably capable, i.e. the opportunity to earn elsewhere is lost.

In order to pursue a claim on the opportunity costs approach it is necessary for the Contractor to prove that the overhead represents a reasonable one by reference to audited accounts for the appropriate period and that work of the same level of overhead recovery was available during the period of delay. Also, this can be proven by production of tender enquiries and publications indicating the level of construction activity during the period of delay. The Contractor should prove that he was actively seeking extra work during the period of delay, and by providing details of tenders which it has submitted. Difficulties can arise where economic conditions are such as to restrict the number of tendering opportunities available where the Contractor was prevented from taking on further works as a result of delay.

In the landmark *Alfred McAlpine* case[87], the Court affirmed that there was no objection in principle to a claim for head office overheads made on the opportunity costs approach, and further that there was no objection in principle to such a claim being calculated by reference to a formula It should be noted however that in this case the Court refused to adopt such an approach because it was the Contractor's working arrangement that they only ever undertook one construction project at a time and did not undertake another until the project was complete. It was therefore inappropriate to use opportunity costs as the basis of calculation.

The mode of claim is where the Contractor argues that, in having resources locked into a site during the prolongation period, he has lost the opportunity of using those resources on other sites where they would have earned a contribution to the costs of running their head office. For this argument to be successful, a Contractor must show that work was reasonably plentiful, and that, on a balance of probabilities, other work was, or would have been, available. This is sometimes referred to as unabsorbed head office overheads, in that the level of head office cost continues but the revenue stream from the particular contract shows a shortfall.

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[87] Alfred McAlpine Homes North Ltd v Property and Land Contractors Ltd (1995) 76 BLR 59

12.12.2 Actual costs approach

The basis is that the prolongation has resulted in the Contractor allocating more overhead expenditure to the project than was originally contemplated at the date of the contract. This is traditionally a less popular method since the records necessary to support the claim are seldom available and the amounts of money generated by this approach are significantly less. In the *Amec Building* case[88], the Courts accepted a claim for head office overheads, based on the actual costs approach but using a formula to calculate the amount attributable to the particular contract.

When a Contractor makes a claim for his overheads and profit, he would normally do so under one of two different forms. Firstly, the Contractor may be able to demonstrate that time and cost of specific, identified, resources at its head office had been incurred during an overrun period. In *Euro Pools and Clydeside Steel Fabrications*[89], the pursuers were able to demonstrate the lost opportunity of their employees, who were diverted from other contracts, for the purpose of addressing defects in the defender's work. They were also able to demonstrate management time spent by their director, and other Engineers, relating to the attendance at meetings and the preparation thereof, and investigating the problem that had arisen through the defect. The Court held that such a claim is based on the second limb in *Hadley v Baxendale*[90], i.e. that the losses claimed were such as might reasonably be supposed to have been in the contemplation of both parties at the time they made the contract as the probable results of the breach of it.

12.12.3 Formula applications

There are more than 10 formula methods in computing unabsorbed overheads in a contract prolongation. The Contractor must confirm the appropriateness of the use of a particular formula selected out of many other formulas available in the industry, in evaluating his loss. (Appendix H provides a comparison).

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[88] Amec Building Ltd v. Cadmus Investments Co Ltd (June 1996)

[89] Euro Pools plc v Clydeside Steel Fabrications Ltd 2003 SLT 411

[90] Hadley v Baxendale (1854) 9 Exch 341

Authority for the use of formulae derives from a number of cases including *Whittal Builders and Chester-le-Street District Council*[91] in which Mr Recorder Percival QC said: "What has to be calculated here is the contribution to off-site overheads and profit which the Contractor might reasonably have expected to earn with these resources if not deprived of them. The percentage to be taken for overheads and profits for this purpose is not therefore the percentage allowed by the Contractor in compiling the price for this particular contract, which may have been larger or smaller than his usual percentage and may or may not have been realised. It is not that percentage that one has to take for this purpose, but the average percentage earned by the Contractor on his turnover as shown by the Contractor's accounts."

These formulae are all approximations rather than assessments of actual costs, and they are all over-simplistic when compared with more accurate alternatives. In *Tate & Lyle* case[92], a claim, based simply on adding a percentage of the overall cost, which is of course even more simplistic than the formulae methods was rejected on the basis that there must have been more accurate methods of assessment open to the claimant of which he had not availed himself. Each formula relies on assumptions, which may not always be appropriate, and the inclusion for an allowance for profits in some of the formulae must be separately justified.

12.12.4 Mark up method

A question still remains how to calculate the amount of the overhead claim? The Employer and the Contractor must consider carefully the contract clauses on requests for equitable adjustments. A variation clause sometimes allows for recovery of both site and home office overhead by means of a percentage of the direct costs. For example, the contract may allow the Contractor a 15% mark-up on direct costs of the change to compensate the Contractor for extra site and home office overhead. (The mark-up may also be designated as inclusive of profit, or profit may be a separate mark-up percentage.)

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[91] Whittal Builders Co Ltd v Chester-le-Street District Council (1987) 40 BLR 82

[92] Tate & Lyle v Greater London Council 1981

The language of the contract may even specify what costs the overhead mark-up includes. For example, one Contractor lost a separate claim for home office overhead costs when confronted with the contract clause that the change order mark-up covered all home office costs as well as site overhead costs. The changes clause mark-up might only be for home office overhead, in which case, the Contractor must present the site overhead costs as part of the direct costs of the change order or claim. Cost adjustment clauses may also include mark-ups allowed on sub Contractor change orders, which the Contractor should, or may be required by its contract with the Employer, to include in the subcontract agreements.

Overhead claims calculated by contractual mark-up are particularly problematic when the actual overhead costs of the related delay are much greater than the overhead costs recovered by the mark-up on the direct costs of the change. For example, suppose that the change direct costs are $10,000, and the overhead mark-up is 10%, or $1,000, but the Contractor has been critically delayed for thirty days at an actual cost of $500 per day for site and home office overhead. The Contractor's actual overhead costs total $15,000, but the overhead compensation is only $1,000. Some claims have been successfully denied by Employers who argued that contractually the Contractor is only due the mark-up for any and all related overhead costs. On the other hand, some Contractors have approached this issue by filing a separate change order proposal or claim for the time-related overhead costs.

As an alternative to the mark-up method, the Contractor may calculate the overhead costs using some other methods. Overhead costs can be prepared as a "forward pricing" estimate and included in the change order or claim cost proposal. For example, the Contractor estimates 3 months of critical delay and prepares a cost estimate for three months of site overhead. It is more difficult to do this for home office overhead, since those costs are not easily related to specific jobs.

The Contractor may also make an overhead claim based on actual costs incurred. Again, this is relatively easy for site overhead. However, determining the actual costs of home office overhead is difficult unless specific home office personnel or resources are assigned to the project related task that generates the extra activity.

Finally, the Contractor can use historical overhead costs either from its financial records or from industry standards. For example, the Contractor's annual financial statements show that over the past 5 years the home office overhead has averaged 12% of direct and indirect project costs, and the 12% is used as a mark-up on the direct and indirect costs of the change or claim to calculate home office overhead costs. Since site overhead varies widely from project to project, an historical average of site overhead may not be applicable to a particular project. Furthermore, the historical method may not be necessary for calculating site overhead, since these costs are readily available as they are usually posted to the specific job. In lieu of these methods, the Contractor may appeal to "industry standards" of overhead costs on similar projects or present expert opinion. However, these should be used only as a last resort, since the Employer will question the credibility and applicability of the selected standard or expert opinion.

12.12.5 Calculated by daily rates

Daily rate for home office overhead is one method used in the construction industry to simplify the calculation of extra home office overhead costs. This is akin to the "daily rate" method used by Employers in Liquidated Damages clauses for Contractor-caused delay. To avoid arguments between Employer and Contractor, daily rates for home office overhead can be set contractually. On one public work project, the bid form included a line item of 50 days of project delay, for which the Contractor had to enter a daily amount for home office overhead and the total of 50 times the daily rate. This locked in an agreement between the Employer and Contractor on the daily rate for extra home office overhead to be used in any compensable delay or suspension claim.

12.13 Embargo – the force majeure

It was a claim for relief by the Contractor for delays in respect of delivery in RC jacking pipes obtained from a supplier in the neighbouring country. The supplier asserts in a letter dated 14 June 2008 that as from 09 June 2008, there was an embargo on exports of iron, cement and concrete products due to shortage of such products locally. The boarder petrol having interpreted this incorrectly applied same to the RC jacking pipes and as such the supplier was prevented from honouring their commitments to the Contractor. This is an after effect of force majeure entitling them from discharge of their liability.

The Contractor made a reciprocal claim time extension on the grounds that it was unable to obtain pipes from the source he has already paid for the supply until the embargo is lifted and pipe could be obtained. By then the Contractor is said to have been supplied with 872 pipes out of which 407 had been laid leaving a balance of 465 as confirmed by the Engineer's representative at site.

The Contractor suggested since he has paid for the total quantity the Employer's intervention to resolve the problem with the neighbouring authorities. The Employer failed in this attempt nevertheless, the Contractor was in any way delayed in the boring operations to install the available number of pipes staked at site. It was for underground micro tunnelling project that these RC jacking pipes have been installed. The Contractor's attempt to product them locally was also proved to be a failure since such diameter is exceptional that no where else could have that calibre in production.

The Engineer's representative denying the claim concludes that the Contractor failed in his contractual obligation to look for alternative sources of supply since a period of 11 months or so. The Contractor also failed to demonstrate that he is even capable of installing the remaining pipes from the available stock at the date of embargo, adding to the cause of delay.

The embargo imposed by the neighbouring authorities is definitely a 'special circumstance' as specifically recognized in the particular clause for time extension. It was felt also that it was the contactor's responsibility to provide sufficient resources to complete the subject works within the time specified. If there was an impediment that is likely to cause delay the Contractor has a responsibility to take adequate measures to mitigate the delay. That means the delay will be inevitable but the effects would have been reduced by the measures taken. There is no such evidence.

On the other hand there was an acceptance by the Engineer's representative that there was a difficulty in getting the necessary clearance from the neighbouring authorities expeditiously. The instruction to find alternative sources should have been given as soon as the embargo was imposed. Therefore it would appear that the 8 months delay in the Engineer's representative's action has been contributory.

The effects of the embargo have been acknowledged by everyone concerned in the issue. In the meantime, everyone was convinced that the embargo would be lifted at any moment. However these delays are not caused by a force majeure event (delays in the supply of materials) but by an event caused by force majeure (the impossibility of the supplier, who had the stocks in hand and able and willing to supply, but was prevented by circumstances beyond control). The Contractor informed that these micro-tunnelling pipes were special as the diameter was 3 metre and only a limited number of suppliers are available in the vicinity. In fact he had considered deploying another supplier but relatively large time of initial approval process barred him doing so at that stage.

However the project was not immediately affected as there were enough pipes at site for the Contractor to carry out his work. As per records, the Contractor had his own delays when executing the micro tunnelling works and he actually had a difficulty due to material embargo only during the last two months where he was compelled to reduce the out put rate. More over, the Contractor could not close 2 isolated shafts because of the final pipe movements.

The Contractor informed that he did not have any program updates. Further he had not revised his base line program at any time during the construction. Accordingly the base line program approved at the beginning of the project was used to simulate the impacts. As per the approved base line, the Contractor shall complete 60% of micro tunnelling work by 24th March 2008. The material embargo was lifted on 26th Oct 2009 and by that time the Contractor had to complete 40% of micro tunnelling work as he did not have jacking pipes for nearly two months.

It was finally decided to recommend the Contractor a reasonable time extension. It was not necessarily the full entitlement (from the time of the embargo until the time pipe supply resumed) but from the date he was compelled to slow down his out put rate (since the micro tunnelling machine can not be stopped half way through on technical reasons) up to the pipes became available at site. Accordingly, an effective period of 160 days was declared excusable. All the other events alleged by the Contractor have either considered in previous time extensions or not critical in the completion. Prolongation costs were not granted on the principle that the force majeure belongs to both parties and more over the Contractor's failure to take mitigatory actions.

In *Electronics and Construction Ltd v Forsyth*[93] (1996), the House of Lords held that where the costs of repair were disproportionate to the benefit to be gained, the winning party was only entitled to nominal damages. It was a case to decide whether a swimming pool had to be constructed to its specified depth, and with that any benefit to be gained.

12.14 Summary

If delays can not be avoided, then they ought to be either mitigated or absorbed within the contract. A Contractor may be delayed by the effects of a change in the work or an event that was simply beyond his control, and then the entity responsible for overseeing the contract, that is Employer, may be obligated to adjust the contract. All depends on the circumstances where the contract forbids or provides for.

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[93] Ruxley Electronics and Construction Ltd -v- Forsyth [1996] 1 AC 344

It is also clear that there is no single definition of the term 'concurrent delay'. Some consider this to be any day that the Contractor did not work during the delay period. Others consider it to be any identifiable delay to any activity with negative float. Still others consider this to be any delay to an activity that had the same or lower total float as the TIA delay. Parties should not hang around till a legal consensus comes in; instead they must attempt to set their limitations using common sense. Concurrent delays are not the delay events but impacts that fell on activities along the critical path. To consider an impact to be concurrent, the impact of which delay events where some of them are held liable by the Contractor and others by the Employer, must fall within the same period. To be more precise, only the overlapping period of impacts will be considered as concurrent, irrespective of their start and end. Also, these delay events once taken independently must critically affect the scheduled completion. This interpretation seems more logical than any other. Further unknown period rule is applicable in computing unabsorbed overhead component in a contract prolongation. Various formula methods have been used in the industry giving widely varying results. Each method has its own limitations and hypothesis.

CHAPTER 13
DEFAULTS AND REMEDIES

13.1 Introduction

In law, a default is a failure to comply with something required by law. Defaults could be intentional, mistaken or out of control. They are a source of claims in contracts. With varying levels and frequencies, some defaults have specific remedies given in contracts and they are already known to contracting parties. In some jurisdictions, Courts may proceed to a default judgment immediately and serve it on the unresponsive party. If this notice is not opposed, or no adequate justification for the delay or lack of response is presented, then the plaintiff is entitled to a judgment in his favour. Defaults cause discharge and are detrimental most of the times.

13.2 Discharge by performance

Discharge of a contract means to set the parties free from their binding contract so that there is no longer a contract to govern their relationship. Usually, a contract is discharged by each party to the contract performing their obligations under the contract with due diligence and care. Performance must conform to exactly what was agreed upon in the contract. Therefore, if a party to a contract deviates from the terms of the contract, the other party is entitled in law to rescind the contract. For example, if the Contractor uses inferior quality materials that do not comply with the specification requirements, the Employer can have the contract rescinded.

13.3 Discharge by agreement

A contract can be discharged by agreement in many ways. An intention to release a particular right and an acceptance of the benefit by the debtor or by someone on his behalf constitutes release. A release can be made by anyone who is competent to alienate his property and it must be made expressly. However, a release can sometimes be inferred from the conduct of a party. For example in one case a landlord who, although he had given notice to his tenant to quit, thereafter accepted rent from the tenant. This was a clear waiver by the landlord of the notice to quit. An intention to release or waive a right is never presumed by the Courts. The law connects the doctrine of consideration with release and sees the consideration for release by mutual consent in the abandonment of the right to performance by each party.

Compromise, novation and delegations are ways of agreement. Compromise takes place where each contracting party recedes from his previous position and concedes something, either diminishing his claim or increasing his liability. The effect of a compromise is that it extinguishes the original debt, when a compromise takes place the creditor usually has a remedy only upon the compromise. Novation means the substitution of a new contract for a pre-existing one. Novation is the substitution of a new debt for an existing debt. A novation totally discharges the original obligation. The new contract is an independent one and must contain some elements not found in the earlier contract. In one case where the contract was for the sale of dismantled materials for immediate delivery, an agreement to postpone delivery did not alter the original contract. Delegation is the substitution of a new debtor for an existing one. The creditor must agree to this arrangement. Assignment is the substitution of a third party for one of the original parties to a contract. The third party takes over both rights and obligations. An assignment results in a complete extinction of the rights and liabilities which have existed under the prior contract. The consent of all three parties is necessary in order to assign a contract.

13.4 Discharge by operation of law

A contract may be discharged by operation of law in the following ways;

a. A person who owes a sum of money to another may be permitted to set off the sum owed if the money was due to him from other person from another transaction. If the debt is larger than the credit, the debt is reduced to the extent of the credit, whereas if the credit is equal or larger than the debt, the debt is wiped out totally.
b. Where the same person is both debtor and creditor in respect of the same transaction, a merger occurs and such a debt is discharged.
c. According to the insolvency ordinance an insolvent is discharged of all debts due by him on his becoming insolvent and from claims and demands made provable under the insolvency.
d. A contract can be terminated by entering of judgment. Once a Court enters judgment on a particular matter, that matter cannot be put aside between the original contracting parties.
e. Although the commencement of a winding up does not put an end to a contract to which a company is a party, when a winding up order has been made or a provisional liquidator has been appointed, no action or proceedings shall be proceeded with or commenced against the company except with the permission.

13.5 Discharge by frustration

A contract may be discharged by frustration. A physical destruction of the subject matter is the most obvious cause for bringing the doctrine into operation. In one case the music hall which was the subject matter of the contract was destroyed by fire. When the hirer of the music hall sued the Employer for damages for breach of contract in not providing the music hall, the Court recognised that the contract was discharged by frustration. Also, an outbreak of war would prevent the performance of obligations under a contract, if the contracting parties reside in countries which are at war with each other. The frustration of the common adventure has also been recognised a terminating a contract. This means that due to the happening of an event after making of a contract, the objective of the contracting parties cannot be attained.

In the case of *Metropolitan Water Board vs Dick, Kerr & Co*[94] by a contract made in June 1914, A agreed with B to construct a reservoir within six years, subject to a proviso that the time should be extended if delays were caused by difficulties, impediments or obstructions. In February 1916, the Minister ordered A to cease work, disperse and sell the plant. The Court held that the provision for extension of time did not cover such a substantial interference so that the contract was completely discharged. However, a mere unanticipated condition which renders contract performance more difficult, burdensome, or more expensive provides no excuse for non-performance. It provides no basis for modification of the contract. Where one agrees to do, for a fixed sum, a thing possible to be performed, he will not be excused just because unforeseen difficulties are encountered.

Hence, the effect of frustration on a contract is to bring it to an end immediately and automatically so that both parties to the contract are released from any further performance of the contract. Further any legal rights already accrued or money already paid before the occurrence of the frustrating event were left intact although the contract was frustrated. This last rule is apparent from the English case of *Chandler vs Webster*[95]. However, the decision in *Chandler vs Webster* was overruled in the *Fibrosa* case in which the House of Lords held that money paid in advance on a contract which was frustrated could be recovered. It was pointed out that an action for the recovery of money paid was not an action on the contract which had ceased to exist, but an action in restitution to recover money paid on a consideration which was totally failed.

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[94] Metropolitan Water Board v Dick, Kerr and Co (1918) Ac 119

[95] Chandler v Webster [1904] 1 KB 493

13.6 Discharge by breach

A breach of a contract may avoid further fulfilment of the obligations of a contract. A breach may usually occur when a party refuses to perform the contract, does something that the contract prohibits, or prevents the other party from performing its obligations. However, not all breaches end up in contract close-out. It is only in two situations that an innocent party is entitled to terminate a contract for breach.

a. Where a party intimates either expressly or impliedly that he does not intend to honour his obligations under a contract when they fall due - known as anticipatory breach. The innocent party can accept the repudiation and sue at once for damages. He can, however, decide to stand upon his contract, hold the other party responsible and await till the time of performance. In the latter event the innocent party has to perform his obligations under the contract; the defaulting party can fulfil his obligations under the contract despite his earlier repudiation.
b. Where there has been a fundamental breach of contract - Where one party without expressly or impliedly repudiating his obligations, commits a fundamental breach of contract, the contract is deemed to be discharged. Various factors are considered in determining whether a breach constitutes a fundamental breach, for it is not every breach which terminates a contract.

For example, a person who contracts to build a house and abandons the contract after only completing the foundation would have committed a fundamental breach of contract. In this situation would a clause exempting the Contractor from liability save him from liability if the other party sued the Contractor for breach of contract? In determining whether the Contractor can save himself from liability one has to look at all the circumstances of the case. In other words, the principle of fundamental breach of contract is not a rigid rule of law applying in all instances but a rule of construction. In some contracts, an exemption clause would be construed as applying even to a case of fundamental breach if the language of the clause is sufficiently clear to indicate an intention of the parties that it shall apply even in case of a fundamental breach.

13.7 Principles in breach

When a party to a contract commits a breach, there are in principle three avenues open for the other party to follow. Firstly, he can enforce or uphold the contract and insist upon the agreed performance i.e. he can insist upon specific performance. Secondly, he can uphold the contract but accept a defective performance. Thirdly, he can resile from the contract, i.e. cancel the contract. If repudiation is opted for, then both parties are released from any further contractual obligation to perform. However, the terms of the contract remain relevant to such matters as establishing liability (e.g. where there is an unfulfilled obligation), assessing damages (including liquidated damages), and resolving disputes (e.g. where there is an arbitration clause) etc.

The innocent party must elect for one remedy or the other, and cannot combine the most favourable elements of the two remedies together. Thus, for example, a party who seeks the remedies provided by a contractual determination clause must follow the specified procedures. Failure to do so may result in the innocent party having to rely on its common law rights, but this can only be done if the Contractor's breach is sufficiently a serious one. Likewise, where the contract provides for determination in circumstances where the common law does not, the innocent party can only take whatever remedies the contract offers.

The choice which the innocent party has between specific performance and cancellation is not a free choice. Firstly, he can only insist on specific performance if specific performance is still possible. But even if specific performance is still possible a Court has discretion to refuse ordering it. Secondly, cancellation is only possible if the innocent party has stipulated for himself a right to resile or if the breach is so serious to justify cancellation.

The innocent party is, of course, only entitled to claim compensation for damage caused by the breach of contract: he therefore first has to prove a causal link between his loss and the breach. Secondly, however, it is not possible to recover compensation for all damage which is causally connected with the breach. In certain cases the damage is regarded as 'too remote' to justify holding the guilty party liable to compensate it. In principle, a party who breaches a contract ought to be held liable only for damage which was foreseen at the time of the breach of contract or which was then reasonably foreseeable and for damage which he undertook to compensate. Also, a question is often that relating to the amount of damages. The principle is that the innocent party must, by the award of an amount of money, be placed in the position in which he would have been had the breach not taken place.

13.8 Repudiation of contract

As mentioned above, a repudiatory conduct does not itself bring a contract to an end. It will come about only when the innocent party chooses to exercise its right to terminate the contract and notifies the guilty party to that effect.

It sometimes happens that one contracting party (A) is in breach of contract and the other party (B) treats this as a repudiatory breach, but it was later held that A's breach was not sufficiently serious to justify this. The question which then arises is whether this mistake means that B, who clearly intended no longer to be bound by the contract, is now guilty of a repudiatory breach, so that A is entitled to terminate the contract. However, the Courts have shown some reluctance to punish a party for an honest but mistaken belief as to the rights and remedies available, and it has thus been held that to invoke a contractual remedy in error, unless it is totally abusive or in bad faith, does not in itself constitute a repudiation of the contract.

13.9 Materiality in breach

A material breach is controversial that goes to the 'heart' of the contract. The injured party can seek damages; that is, a monetary compensation enough to cover economic losses resulting from the breach of contract. For example, a Contractor uses materials that are not in compliance with the specification. A material breach is any failure to perform that permits the other party to the contract to either compel performance, or collect damages because of the breach. If the Contractor in the above example had been instructed to use copper pipes, and instead used iron pipes which would not last as long as the copper pipes would have, the Employer can recover the cost of actually correcting the breach - taking out the iron pipes and replacing them with copper pipes. The Contractor's refusal to start work is clearly a material breach whereas the use of wrong ironmongery is a non material breach.

For example, a Contractor for a HVAC system under which the maintenance is periodically taken place does not make inspections on a regular basis. This act is a technical breach of the contract but is immaterial as long as the ultimate objective of continuity of uninterrupted operation has been ensured.

Various circumstances can worsen to a degree that a disgruntled Contractor has no option but to abandon the contract and walk off the site. Whether due to non payment, inadequate design drawings, too many instructions that cause the works technically different than envisaged in the original contract, excessive Employer intervention, lack of cooperation from the Engineer, or otherwise, the circumstances can be simply beyond the control of the Contractor where the decision to abandon the contract would become inevitable. An analysis of when a Contractor may justifiably abandon the contract begins with the fact of materiality. A breach is considered material if it substantially deviates the purpose of the contract and is serious enough to justify the other party in abandoning the contract.

A material breach releases the non breaching party from all obligations further owed to the breaching party under the contract whereas a non material breach will entitle the non breaching party to recover damages but will not release him from further obligations. However, there is no litmus test that can readily distinguish the material breach from the non material breach. An immaterial breach of contract is a breach that does not vitiate the contract.

In determining whether a breach is material, a Court may give consideration to the factors such as the extent of the injury to the non breaching party, the extent of which the injured party can be compensated, the extent to which the breaching party will suffer forfeiture, the likelihood that the breaching party will cure the default and the extent to which the breaching party evidences good faith and fair dealing.

In the case of *Pipeline*[96], the Employer terminated its Contractor and hired a replacement Contractor when more than half way through the term of the contract, the Contractor had completed only one percent of the project. The Contractor contended that the Employer's termination was wrongful while the Employer claimed that the Contractor's failure to adequately prosecute the work constituted a material breach of the contract, thereby excusing the Employer from any further obligations under the contract. In concluding that the Contractor's breach was material, the Court gave a significant weight to the fact that the contract specified that the time was of the essence, the Employer had requested guarantee from the Contractor for timely completion and the Employer even offered suggestions as to how the Contractor might expedite construction.

A breach of contract is therefore an actionable wrong that will definitely expose the erring party to penalties. Common remedies for breach of contract more often includes demand for specific performance or rescission of the contract or claim for damages. It bears stressing that good faith must be exercised at all times. Full compliance with the terms and conditions laid down and specified in the contract must be observed.

13.10 Termination for convenience

Termination for convenience provides the Employer with the option to terminate the remaining balance of the work for a reason other than the Contractor's default. For example, if the Employer cannot obtain additional financing to complete the work, the Employer can terminate for convenience so long as there is a termination for convenience clause in the contract. However, if the contract does not contain a termination for convenience clause, and the Employer terminates the contract before the work is complete, then the Contractor would be entitled to the value of the work completed plus a reasonable profit margin that would have earned on the remaining works of the contract.

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[96] Mustang Pipeline Company, Inc. v. Driver Pipeline Company (2004)

In every contract there is an implied covenant of good faith and fair dealing. Therefore, it can be argued that if the termination for convenience clause is exercised in bad faith, the termination may be a breach of contract. For example, if the Employer chose to exercise the termination for convenience clause when the project work was ninety percent complete in order to avoid paying the balance of the profit on the remaining contract work, the termination could be in bad faith constituting a breach of contract.

In a termination for convenience, the Employer may terminate the contract for whatever reason it wishes, such as commercial reasons, or as the most expeditious way of eliminating a non-performing Contractor with minimum risk of a legal dispute. Contractor's remedies for termination for convenience vary from contract to contract, but may include a reasonable cost of work performed prior to termination, anticipated profits on uncompleted work, and costs on demobilisation and other costs as may be justifiable.

13.11 Termination for cause

Termination occurs when the Employer instructs a Contractor to permanently stop the performance of work and leave the site. Therefore, the decision to proceed with this option should not be taken lightly. Some of the more commonly cited reasons for terminating a contract for cause include failure to pay labour, sub Contractors, vendors, or material suppliers, failure to meet the project schedule or diligently perform the work, defective or deficient performance, failure to follow applicable laws and regulations and failure to consistently follow safety requirements.

Since some construction contracts provide for excusable delays, such as force majeure, the decision to terminate for cause must also consider events which are excusable under the contract and prevent the Contractor from performance. Termination-for-cause contract clauses vary from contract to contract, but some may require the Employer to provide proper notice to the Contractor of its alleged breach or failure to perform and provide a reasonable period for the Contractor to cure, or start to cure, the alleged breach.

Typical claims from Employers under termination for cause include replacing one Contractor with another almost invariably results in overall project delays, loss of profits or deferred production, liquidated damages or actual damages for delay and cost to complete the project if the final project costs exceed the value of the terminated contract less amounts paid to the terminated Contractor. Typical claims from Contractors under termination for cause may include costs to bid the project, mobilization and demobilization costs, anticipated profit on the project, costs for work performed but not paid, home office overhead costs, winding-down costs, damages for loss of good will, loss of future business due to potential negative publicity following termination.

13.12 Termination for early default

A 'cure' notice is an early warning to revert back to normalcy. It is an inducement to take precautionary measures to avoid further upheaval. Where a Contractor has failed to respond adequately to the Employer's reasonable request of assurances of timely performance in form of a cure notice, the Employer can be entitled to regard the Contractor's failure to provide such assurances as a breach of contract. The issuance of a cure notice may be justified even if the circumstances at that point do not justify a termination for default. When the Employer issues a cure notice the Contractor has an obligation to take steps to ensure smooth progress, or give assurance that progress is being made, towards timely completion. Failure to adequately respond to the notice may even enough to justify termination for default. This principle has been established in the case of *Richard Danzig v. AEC Corporation*[97], where the Navy being the Employer in the contract became concerned when the progress of the Contractor's work began to fall behind schedule. The Contractor was apparently having financial difficulties with its surety, and this was delaying the work, and as a result the Navy issued a cure notice requesting the Contractor to get back to work on schedule.

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[97] Richard Danzig v. AEC Corporation, 224 F.3d 1333 (2000)

It was held that whenever the Employer has reasonable grounds to believe that the Contractor is going to fail in execution as per the schedule, it is reasonable to infer that the Employer starts with a cure notice as a precursor to a possible termination of the contract. However, in some cases, it can be argued that a lack of response may not adequate enough to take a decision on termination. It is actually the Contractor's lack of effort resulting in low productivity over a considerable period of time that reasonably matters for an Employer to institute action on termination. In fact, termination is an action reserved at the extreme end of a contract for worse case eventualities.

13.13 Hadley vs Baxendale

Where the losses are such that they would be reasonably foreseeable when the contract was made to result from the breach of contract, damages could be recoverable. This principle was laid down in the English case of *Hadley vs Baxendale*[98]. According to this rule damages can only be recovered if they are proximate. In this case, a mill owned by X had a broken shaft. X delivered the shaft to Y, a carrier, to be taken to a manufacturer to be imitated, for the purpose of making a new one. As a result of Y delaying delivery of the shaft beyond a reasonable time, the mill was idle for a longer period than would have been necessary. Y was not informed by X that delay would result in a loss of profit. X sued Y for the loss of profit caused by this delay. There were only two possible grounds upon which X could sustain a claim. Firstly, that in the usual course of things the work of the mill would cease altogether for want of the shaft. It was held that this would not be the normal occurrence because it was reasonably possible for X to have had a spare shaft. Secondly, that the special circumstances were disclosed that the inevitable loss of profit was made apparent to Y. Therefore, it was held that X was not entitled to damages on either of these grounds.

According to these rules damages could be claimed for normal loss (loss that occurs in the usual course of things) or for abnormal loss (loss that arises because of special or exceptional circumstances). Where owing to the special circumstances, the breach causes losses outside the natural course of events what has to be decided is whether the special circumstances were within the actual or constructive knowledge of the defaulting party at the time of contract.

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[98] Hadley v Baxendale (1854) 9 Exch 341

In another case, the plaintiff who bought a house on the advice of the defendant, a solicitor, decided to sell it but could not get the market price for the house as the title was defective. The solicitor, having admitted that he was negligent in his investigation of the title was clearly liable to pay by way of damages the difference between the market value of the house at the time of purchase and the value of the house at that date with the defective title. However, the Court held that the plaintiff's claim for compensation from the solicitor for the cost of valuation of the house, interest on his bank overdraft, hotel expenses and telephone calls to his wife, were not recoverable as the solicitor could not have known that these were likely to result from a breach of the contract.

13.14 Mitigation of damages

It is the duty of the injured party to take reasonable steps to minimise the damages. The law imposes a duty upon the plaintiff to take all reasonable steps to mitigate the loss caused by the breach of contract and debars the plaintiff from claiming compensation for any part of the damage which is due to his neglect to take reasonable steps. If the plaintiff accepts the breach and sues the defendant for breach of contract, he is under a duty to mitigate his losses. However, if he does not accept the breach holds the defendant to the contract and awaits the date of performance the contract remains active and the question of damages or mitigation does not arise.

In one case the defendants agreed to hire space for advertising on litter bins for three years beginning from the date of the first advertisement. Later the same day they cancelled the contract. Although the plaintiffs had not taken any steps to carry out the contract, they refused to accept the repudiation and carried out the contract. In due course they sued for the full contract price. The Court upheld their claim. Although the plaintiffs were under no duty to mitigate, they were not to escalate the loss.

13.15 Liquidated damages and penalty

An obligation on the Contractor, in respect of time under the contract, is to bring the works to practical completion by the date contractually due for practical completion. Where the Contractor breaches the contract by failing to bring the works to practical completion, the Employer would, in the absence of any other provision, have a contractual entitlement to sue for damages.

A convention has evolved, for the common convenience of the parties that such damages are pre-agreed at the time of entering into the Contract. For this purposes, such damages are usually referred to as 'liquidated damages' which means a specific amount rather than an amount to be determined by the Courts.

The operation of a liquidated damages clause effectively limits the potential exposure of the Contractor to damages for late completion, because only a fixed sum shall be payable by the party responsible, subject to a ceiling limit. This sum could be either 'liquidated damages' or a 'penalty'. This distinction is important because if it is a penalty only the actual damage suffered can be claimed, while if it is liquidated damages the sum fixed can be recovered. The intention of a penalty is to compel the performance of the contract by providing something by way of punishment if the contract is not performed. A penalty is designed merely to provide security for the performance of a contract. The essence of liquidated damages is a genuine pre-estimate of damage. The Court will ascertain whether a sum is in fact a penalty or liquidated damages, irrespective of the titles assigned to them. The Courts have laid down certain rules in determining whether a sum fixed as damages is liquidated damages or penalty.

a. The amount fixed is a penalty if it is extravagant in amount when compared with the greatest loss that could possibly result from the breach.
b. If the obligation of the promisor under the contract is to pay a certain sum of money and if there is agreement that if he fails to do so, he shall pay a larger sum; this larger sum is a penalty.

c. If there is only one event upon which the conventional sum is to be paid, the sum is liquidated damages.
d. If a single lump sum is made payable upon the occurrence of one or more or all of several events, some of which may result in serious and others in mere damage, the presumption is a penalty. If it is practically impossible to prove the exact monetary loss that will accrue from a breach of the various stipulations, the presumption is weakened. In such a case the sum fixed by the parties, provided it is reasonable, will be allowed as liquidated damages.

The primary remedy for any breach of contract is however an award of damages and the Employer may invoke this clause to impose penalties due to non-completion of work on time. The payment of such penalties does not relieve the Contractor from completing outstanding works.

Hence, a provision of LD will be valid if it is a genuine attempt to pre-estimate the likely loss. A penalty is a sum quite disproportionate to the Employer's likely loss and is set at a punitive level to persuade completion. It is not a LD if the sum stipulated is unreasonable in relation to the maximum possible loss that could be suffered, as mentioned earlier. However, the Courts have generally declined to enforce 'penalty' clauses. For this reason, it is usual to make the liquidated damages a genuine pre-estimate of the damages likely to be suffered by the Employer in the event of late completion (albeit that this pre-estimate is made at the time of entering into the contract rather than when the delay occurs, at the end of the construction period). It may suffice to say, however, that penalty takes the nature of an amount unrelated to the actual damage suffered.

If the Contractor intends to avoid penalties or liquidated damages by showing his entitlement for extension of time, he must produce evidence to prove that;

a. his program at that time was realistic and he could have achieved targets
b. he was achieving the planned rate of progress
c. a delaying event occurred

d. cause of the delay gives a time extension entitlement under the contract
e. delaying event affected the rate of progress of relevant activities
f. the effect to such activities has affected the completion date

It is pretty obvious that when the amount of damages is difficult to predict, a liquidated damages clause will generally be upheld unless the court determines that the clause was intended to be a penalty rather than liquidated damages. Contractors might still argue that the amount of liquidated damages was punitive rather than reasonable. Still, the Contractors have the burden to establish that the liquidated damages clause was intended to operate as a penalty. To prove that, it is necessary to ask at least three things: Did the parties intend liquidated damages or a penalty? It is the terms of the contract that provides best evidence of the party's intent. Was the amount of damages that would be caused by a breach uncertain in amount or difficult to determine? Of course, the more difficulty there would be in proving that a loss has occurred or the amount of the loss in the event that it occurs, the easier it is to show that the amount fixed as liquidated damages is reasonable. The court evaluates this question based on the reasonable expectations of the parties as of the date the contract was executed. The other question is does the amount of damages bear a reasonable relationship to actual damages that could be sustained in the event of a breach? The amount is reasonable if it approximates the loss anticipated at the time the contract is executed, even though it may not necessarily approximate the actual loss.

There are four rules for the recognition of liquidated damages.

a. The first rule is when liquidated damages are invalidated because they are a penalty (i.e.: they do not represent a genuine pre-estimate of loss), the cap on liquidated damages will not act as a cap on damages claims at law.
b. Clause invalidated due to acts of prevention by the Employer is the next rule. A liquidated damages clause will cap the Contractor's liability where a liquidated damages regime

breaches the prevention principle because this gives effect to the commercial bargain struck by the parties.

c. Also, a liquidated damages clause which is uncertain is severed from the contract in its entirety, and will not act as a cap on the damages recoverable by the Employer from the Contractor. Upon severance, the clause is, for the purposes of contractual interpretation, ignored.
d. However, it should be noted that the threshold test for rendering a clause void for uncertainty is high, and Courts are reluctant to hold that the terms of a contract, in particular a commercial contract where performance is well advanced, are uncertain.

13.16 Bankruptcy and abandonment

The clause 'defaults of the Contractor' gives the Employer a wide authority to take over the works of the Contractor under several circumstances where the Contractor is considered to be in default. Whenever the Contractor becomes bankrupt, has a receiving order made against him, presents his petition in bankruptcy, makes arrangements in favour of creditors, agrees to carry out the contract under a committee of inspection of creditors, and finally goes into liquidation other than voluntary liquidation for amalgamation are the first in line for the Employer to take swift actions in law and under contract.

Whenever the Contractor abandons the contract without justifiable reason are the defaults in equal gravity. Abandonment of work is indeed a rare proposition a Contractor would take at the last resort. This is generally the walk-off leaving all belongings at site together with intangible obligations in hand. The most obvious example of repudiatory breach by a Contractor is total abandonment of the work in circumstances where it is unjustified. Whether less extreme action by the Contractor will have this effect is, as usual, a question of fact. For instance, a Contractor who was complaining of late payment may retaliate by withdrawing their labour and most of their plant from the site and thus slowed down progress considerably. However, the Contractor may retain a presence on site though their supervisory staff does nothing to discourage their sub-Contractors from continuing with work. A prudent Contractor may apply various tactics to induce the Employer to come down to site level, though clearly in breach of contract, were not may not be sufficient to justify the Employer in terminating the contract.

More than individual contracts however, the issues related to bankruptcy and insolvency are governed by various legislative provisions. Generally, these statues provide a mechanism to rescue the insolvent party through the appointment of administrators and administrative receivers. There is usually a little that can be grasped from standard forms related to insolvency that basically involves either the inability of party to be able to pay their debts as they arise or when the value of the party's liabilities exceed their assets. The assets of the insolvent party must be applied *pari passu* in the discharge of the insolvent's debts and there must be no priority as between unsecured creditors. Also, there must not be transfers at an under-estimated amount or attempts to ensure that one creditor is favored over another. Contractual arrangements between parties should not violate the scheme of the insolvency and the rights of the other creditors, therefore.

13.17 Defective work

Defective work is basically a breach of the contract provided the impact is substantial whenever the defects are scattered everywhere in the works. As a general principle, defects in the work do not entitle the Employer to terminate the contract and refuse payment altogether. The Employer's remedy is to claim damages for the cost of rectification. However, very serious defects may justify the conclusion that there has not been 'substantial performance' by the Contractor. Where this can be established, the Employer need pay nothing. For example, the installation of a central heating system at an inclusive price of £560 was defectively carried out. The system was only 90% efficient giving off fumes in the living room. The Court of Appeal held that the claimant was entitled to nothing for this work the defendant was not limited to setting off the £174, which it would cost to put right the defects. In nutshell, unsatisfactory manner of execution, persistently neglects to carry out obligations despite previous notice, fails to remove materials or work rejected by the Engineer, delays in performance and sublets any part of work which results in bad workmanship are also defaults under the contract.

13.18 Delay in performance

A delay by a Contractor may justify the Employer in terminating the contract. First, the delay must be so large enough to demonstrate the Contractor's intention not to be bound by the contract. Second, the contract itself may make clear that the time of completion is of critical importance that is whenever the time is of the essence. Third, once delay has occurred, the non-delaying party may make time of the essence by giving reasonable notice to the other party. Delayed progress alone, therefore, though potentially a serious default, is rarely the basis for termination unless the delayed progress is so substantial as to make it obvious that the Contractor will be unable to complete the works by the date due for completion.

Whether or not a Contractor's breach of contract is sufficiently serious to justify the Employer in terminating is always a question of fact. The Employer may invoke various clauses when he contemplates that the Contractor is in default. The Employer has the power to enter into site and expel the Contractor and sell plants already deployed on site, temporary works and materials that have been deemed to be his property. The Engineer is authorised to determine ex-party the amount entitled and due payable to the Contractor or Employer after such expulsion. This does not however restrict the possibility of having negotiations with the defaulting party.

The payment after forfeiture is that any excess paid to the Contractor is deemed to be a debt due by the Contractor to the Employer. In the event the Employer expels the Contractor, he is not sometimes liable to pay any amount due to the Contractor after valuation till the expiry of the maintenance period.

Further, the assignment of works without first obtaining the Employer's consent, failure to commence works without reasonable grounds and suspension of progress for a specified period time after reminding notice to proceed have been a couple of notorious

Contractor's defaults. The losing party may seek a specific performance as the next available option. This is a remedy issued by a Court ordering a contracting party to perform its obligations under a contract in the event of failure or refusal to do so. This remedy is discretionary and will not be granted where damages are an adequate remedy.

13.19 Delay in site possession

While minor interference by the Employer with the Contractor's possession of the site is not a repudiatory breach but an outright refusal to give possession in the first place will be so. Similarly, wrongful ejection of the Contractor from the site is such a breach. Delay in site access in a road project due to delay in the process of resettlement of the residents either side of the road may not necessarily result in a breach whenever the Contractor has been given access to some other segments to commence work as the next available option. Accordingly, a mere delay in giving possession is something that should relate to whether the Employer's conduct indicates an intention no longer to be bound by the contract. For example, where an Employer delayed giving possession of the site for two months despite repeated requests from the Contractor, and also announced that part of the contract work was to be omitted and given to another Contractor, it can well be that these two breaches, taken together, amount to a repudiatory breach of contract.

13.20 Delay in payment

Delay in payment is always a Contractor's agony. Strictly speaking, if the Employer fails to pay the Contractor within the period stated in the contract after the Engineer's certification (subject to other provisions), obstructs the Engineer in issuing such certificate or refuses any approval which can fundamentally affect the execution of work, the Contractor may well be having a legitimate ground to terminate his own employment. Indeed a rare proposition is that the Employer gives formal notice to the Contractor that for economic dislocation, it is impossible for him to continue to meet his contractual obligations. The Contractor has no option but to terminate his own employment after giving usually 14 days prior written notice to the Employer with a copy to the Engineer. Upon expiry of 14 days, the Contractor shall remove all his belongings including plants and equipment onsite. The Employer is obliged to make payments including damage by consequence of such termination. Accordingly, various acts and inactions by the Employer can result in a repudiatory breach, thus entitling the Contractor to terminate the contract.

As a general principle of law, failure to pay on time what is due under a contract will not normally be treated as a sufficient breach to justify the other party in terminating that contract. Failure to pay on time what is owed on another contract is even less likely to be a repudiatory breach. This is why contracts commonly provide express rights of determination for non-payment. However, while late payment (or short payment) is not in itself repudiatory, a continued refusal to pay becomes a repudiatory breach. This is similar to a delict of nuisance where the plaintiff has to prove that the subject nuisance has been continuing.

13.21 Consequential losses

Consequential damages may be recovered if it is determined such damages were reasonably foreseeable or within the contemplation of the parties at the time of the contract. This is a factual determination that could lead to the Contractor's liability for an enormous loss. For example, the cost to complete unfinished work on time and the loss on operating revenue, an Employer might claim as a result of late completion.

Where a party sustains a loss by reason of a breach of contract, so far as money can do it, the party shall be placed in the same situation with regard to damages, as if the contract had been performed. The general rule is thought to be compensatory, where the rule in Hadley v Baxendale remains clear. "Where two parties have made a contract which one of them has broken, the damages which the other party ought to receive in respect of such breach of contract should be such as may fairly and reasonably be considered either (1) arising naturally, i.e. according to the usual course of things from such breach of contract itself, or (2) such as may reasonably be supposed to have been in the contemplation of both parties at the time they made the contact, as the probable result of the breach of it."

However, a party relying on a consequential loss must have actual knowledge at the time of the contract of special circumstances likely to cause the loss; otherwise the damages are considered as too remote to be recoverable. Depending upon the facts of a particular case, consequential damages may include lost profits, loss of bonding capacity, loss of business reputation, loss of use, diminution in value, lost rental income or unabsorbed or under absorbed home-office overhead resulting from the delay. More commonly the case of consultancy fees additionally paid by the Employer is consequential to the delay by the Contractor. To determine which consequential damages are recoverable, the Courts apply the test of foreseeability. Those consequential damages that the party breaching the contract knew or reasonably should have foreseen would result from a breach (at the time of contract formation) are recoverable; those the party did not know and should not reasonably have foreseen are not recoverable. Damages that are not reasonably foreseeable are literally referred to as remote damages.

In nutshell, the parties can maximise recovery for damages (or minimise exposure to damages) in several ways. Parties to the contract can include a waiver of consequential damages and a liquidated damages provision. However, that there may be direct damages that are not included within the purview of a liquidated damage provision and, of course, fall outside the waiver of consequential damages. These direct damages could include, for example, any costs to repair or replace negligently constructed work, expert costs to investigate existence of design errors, and demolition, dismantling or other taking away costs.

Consequential damages are not simply damages beyond direct property damages as mentioned. They are much narrower as clearly foreseeable with special knowledge. They are not necessarily economic losses. When negotiating a contract the parties should consider those damages which they expect to be recoverable, and those which will be excluded, or limited, in the event of a loss. Courts will only enforce the narrow meaning of the words used to exclude or limit responsibility.

Where the parties agree to exclude or limit damages for overheads, loss of profit, or additional costs to bring the project back to the level, then those potential losses should be specifically excluded or limited by the terms of the contract in writing.

Accordingly, losses can be recovered under two limbs namely the losses arise naturally, according to the usual course of things, as the result of the breach (first limb); or the losses that were contemplated by the parties, at the time the parties made the contract, as being the probable result of the breach (second limb). Consequential loss in construction contracts is equated with the second limb, as they are often be specified clearly in writing, such as payments to consultants during period under liquidated damages.

If the Contractor is entitled to an extension of time, the Employer will not be entitled to recover financial loss suffered in consequence of the delay. If the Contractor is not entitled to an extension of time, then the Employer will be entitled to recover liquidated damages for delay. In case the liquidated damages have not been agreed, he could be entitled to recover his actual financial loss. The insurances normally effected by Contractors do not provide the Employer with an indemnity against financial loss resulting from loss or damage to the contract works. Also, the conditions of contract do not stipulate an insurance coverage to include this exposure.

A limitation clause gives the parties the ability to cap certain types of losses at an agreed maximum. The Contractor's liability for loss of use, loss of profit or other consequential loss arising in respect of the liability of the Contractor shall be limited to the amount, if any, named in the Contract. However, where a penalty period prevails, meaning that the Employer cannot use the facility, or that an opportunity to make a profit has been lost, a 'loss of use' or 'loss of profit' claims would succeed only up to the amount of any agreed cap, one of which is the payments to consultants, as specified in the contract. This compensation to the Employer shall be the amount payable to the Consultants whose deployment has been made mandatory because of the extension of services during the prolonged period.

13.22 Unsound construction

Hardly the legal parameters for unsound construction are come across. Literally, it could be a defect in construction that causes the structure of the building dangerous for human habitation. Because of the detrimental nature of the issue, many legal systems have intervened, recognized and imposed a couple of rulings as fundamental to any construction contract. Accordingly, unsound construction has been fallen a part of decennial liability in which the Contractor and design consultants are jointly liable for the cost of rectifying structural defects that appear in a building or structure within a specified period of time, usually 10 years, and in some cases 15 years. As discussed previously, decennial liability goes beyond the limits of mere professional indemnity where a consultant is liable for negligence, errors and omissions for a limited number of years, depending on the type of services.

Also, the decennial liability, overlapping the principles of tort and contract, sometimes takes a different approach in the burden of proof. It is not necessary to prove any negligence or breach of contract and no fault is necessary in order for liability to arise. Total or partial collapses of the building and/or a defect threatening the stability or safety of the structure are the trigger events recognized in the scope of liability and it attaches notwithstanding that the collapse or defect is caused by sub surface conditions or that the Employer approved the defective work. More over, the agreements purporting to exclude decennial liability are considered to be void. Contractors and consultants are unable to pass the risk of decennial liability down to its sub Contractors and sub consultants, However, the design consultants who have no involvement in construction supervision is liable only for the design errors. Overseeing the construction works results in the consultants being jointly and severally liable with the Contractor for design and workmanship. This 'joint' liability has been imposed because of the inability or if not the difficulty to apportion the 'blame' between two entities in monetary terms, regardless of where the fault should truly lie.

Since the decennial liability falls outside the standard coverage of the Contractor's all risks policy and its expiry with the issue of practical completion certificate or at least at the end of defects liability period, decennial liability is not a matter for insurance. This has been exacerbated by the fact that the level of indemnity is not sufficient to meet the losses caused by a structural defect since the extent of some defects to result in a structure having to be demolished and rebuilt. It is therefore by no means certain that such policies, either the Contractors' all risk policy or the consultants' professional indemnity insurance, may respond to such claims related to unsound construction causing structural defects, imperfections, shrinkages, early obsoleteness, deterioration or ultimately the collapse.

Usually, the Contractor's liability on safety for instance is operative for 10 years. As such, the maintenance certificate does not end the Contractor's liability for defects. It does not deny the Employer the opportunity to claim for defects that arise beyond such certificate into the limitation period. The Contractor is liable for defects due to unsound construction, which were not detected or deliberately hidden in worse case eventualities, during the currency of the works.

13.23 Strict liability

Although bad intention *(dolus)* or negligence (*culpa*) is crucial to legal liability for causing harm or loss to another, a legal responsibility for harm or loss caused to another may arise even when there is no intention to cause harm or no negligence. This is described as liability without fault or 'no-fault' liability or strict liability. No fault liability without proof of fault is thus clearly distinguished from 'fault' liability based on intentionally wrongful or careless conduct.

Strict liability recognizes the concept of risk sharing. A person who creates the risk must be liable for the consequences irrespective of his mentality. When fault becomes the exclusive basis for imposing liability the victim has to absorb the total loss. The loss falls on the victim, and the creator of the risk is exempt because he does not intend to cause the loss or takes all reasonable precautions to avoid it. Thus a manufacturer of a product can avoid liability to a consumer or resident of an industrial area for loss caused by defective products or pollution, for instance. They can show that there was no intention to cause harm and all that is reasonable precautions had been taken to avoid harm or loss to the consumer or residents.

13.24 Defects liability

Where the Contractor fails to rectify defects, the Employer may take those works out of the hands of the Contractor and perform those works at the Contractor's expense. There is a fundamental misconception as to the nature of this obligation, however. The defects liability provision constitutes both right and obligation.

It is the privilege of the Contractor to be entitled to return to the site and rectify defects as they might appear during the defects liability period. The alternative would be for the Employer to have the defects rectified by others, at the Contractor's expense, and to deduct the costs of that rectification from the retainage still being withheld by the Employer. It would be substantially cheaper, as a rule, for the Contractor to attend the site and rectify the works himself. In this respect, the provision constitutes an obligation on the Contractor to attend and rectify.

Any outstanding work, which should be completed during the period of maintenance, shall be commenced as soon as practicable after practical completion. This means that the Contractor is not intended to wait till the brink of the expiry of maintenance period. The Contractor in the meantime may identify whether defects detected during maintenance period are his liability or due to some other causes for which he is not responsible. Defects fallen apart of his shortcomings should be intimated to the Engineer. The Contractor has a right to enter into the site and forthwith attend to defects with a view to minimise his costs and is why the Employer must facilitate him in undertaking defects at any point of time. However, this is arguable depending on the nature of defects.

Although, the usual wear and tear has been exempted from the maintenance liability, the term 'defect' has been elaborated to cover works of similar nature including repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkages and other faults such as cracks. The Contractor's obligation goes beyond repairing defects that are a direct consequence of his defaults.

Any defects, shrinkages or other faults arising during this period due to defective materials or workmanship must be put right by the Contractor at his own expense, unless he proves that such work were necessitated due to no fault of his. While the Contractor has the obligation to put right any defects that appear, the Employer who discovered defects should operate the contractual defects liability procedure. If however, he finds any defect not rectified, he should inform the Contractor in writing and the certificate should be issued only after such defects are rectified.

A search is made by the Contractor for defects. The Contractor is reimbursed any cost expended by him in carrying out rectification of defects identified during his search, which were not fallen within his liability. This does not prevent the Engineer to issue a list of snag detected at any point of time before expiry of maintenance period.

The defects liability clause does not act as an exclusion clause. Even if a defect is not enlisted or not noticed by the Contractor, the Contractor is still liable for it. For instance, a plant which is planned to produce 99% function can only on technical reasons produce to a level of 65% function. As the Employer could not achieve the desired level of output, the plant would be totally useless. However, the Employer would be entitled to claim wasted expenditure, lost profit or any other financial cost but it is not likely that he would those elements for the entire life of the plant (as it might reasonably be expected that if the product was physically capable of being produced he would engage another Contractor to rectify it within a reasonable period of time).

13.25 Cessation of Employer's liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it in the Final Statement and Statement at completion (as described in Sub-Clause 14.10 in the FIDIC Red book).

However, this sub clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer. It should also be subject to the clause titled 'unfulfilled obligations'. Since this contractual cessation ceases liability, any unsettled claim pending resolution is usually taken up before the final certificate, or optionally, the Contractors refrain from signing such certificate.

13.26 Summary

When a party to a contract commits a breach, there are three avenues principally open for the other party to follow. Firstly, he can enforce or uphold the contract and insist upon the agreed performance i.e. he can insist upon specific performance. Secondly, he can uphold the contract but accept a defective performance. Thirdly, he can resile from the contract, i.e. cancel the contract.

Both the Contractor and the Employer shall remain liable for the fulfilment of any obligation incurred under the provisions of the contract prior to the issue of the defects liability certificate which remains unperformed at the time of such certificate is issued. A contract shall be deemed to remain in force between the parties solely for the purpose of determining the nature and extent of any such obligations.

Sometimes, the Employer's prevention in form of hindrance, obstruction or lack of cooperation, may be so serious as to indicate an intention not to be bound by the contract. This has been held to be the case where an Employer wrongfully ordered the Contractor not to complete the work, where an Employer failed to provide the necessary drawings as required by the contract and where an Employer presuming that work was falling behind schedule, employed another Contractor to carry out part of the work. However, the clause 'Unfulfilled Obligations' does not construe any meaning that the Employer or Contractor could after the issue of maintenance certificate expect either party to be liable to comply with any matter. The liabilities of the parties are confined to matters that had arisen prior to the issue of maintenance certificate.

CHAPTER 14
SETTLEMENT OF DISPUTES

14.1 Introduction

Construction contracts have been promoting the concept of multi-tiered dispute resolution apparently because of inherent advantages attached with the process at many distinct and escalating stages of a dispute. Techniques which are commonly incorporated into multi-tiered dispute resolution clauses include negotiation, mediation, expert determination, and arbitration and finally the Courts as the tiers escalate. For instance the latest FIDIC version the clause 20 provides for a multi-tiered dispute resolution procedure, starting from submitting a claim to the Engineer, who makes a determination under sub-clause 3.5, referring to the Dispute Adjudication Board (DAB) for its decision, giving a notice of dissatisfaction in respect of their decision, amicable settlement and then the arbitration. Conditions of contract mandate the disputants to follow this gauntlet without skipping a tier in between.

A reason for using multi-tiered dispute resolution is to improve efficiency and lower the cost in pursuit of a settlement. Arbitration, while an effective method of dispute resolution, can be costly and time consuming. A multi-tiered process also acts as a filtering process, saving both time and money by addressing more basic disputes at a lower level while shifting disputes all the way in a hierarchy for early resolution and minimum hostility.

While such a process provides certain advantages over the traditional one-off forms, the gauntlet can increase the risk of failure. Making the right choice is therefore important. As a technique, there is scope for multiplicity of disputes. As disputes may arise at different times under a contract, parties are able to get into the dispute resolution process for each dispute when it arises. The danger is when the same subject matter is taken up in the multiple processes. Another example is when different categories of disputes are dealt differently with this mechanism. If disputes arise simultaneously or sequentially and there are questions of technical and contractual nature for which an expert determination and arbitration has been advised respectively, it may create inefficiency in managing the dispute as a process and may even lead to inconsistent findings.

In nutshell, multi-tiered process is valuable in relation to large construction contracts which inevitably involve conflicts amongst a larger audience of disputants. A well-structured multi-tiered clause can therefore effectively deal with a range of conflicts with a minimum of disruption to the project execution.

14.2 What crystallizes a dispute?

Literally, a dispute is a difference of opinion or conflict of interest. Although there is no legal definition of the term 'dispute', various Court decisions have set out guidelines as to how a dispute may emerge. Though the term 'dispute' is to be given the meaning in ordinary sense, a dispute in construction contracts essentially takes a different dimension. A dispute in construction is neither an issue nor a claim, pending settlement. In order for a dispute to arise, there should be an issue (or a couple of issues connected with), be them commercial, contractual or technical, escalated to a formal claim, submitted by claimant and disagreed or denied by the respondent, and then disputed by the claimant. Hence, the issue, claim and dispute is the escalation and if no claim is submitted, then no dispute can arise by definition. The mere fact that one party notifies the other of a claim does not automatically give rise to a dispute. A dispute does not arise until and unless it emerges that the claim is not admitted by the respondent. Even an upfront denial on the ground of incorrect format would not be a dispute up until the claimant formally notifies his intent to start proceedings under the dispute clause.

One of the advantages of the above principle is that it avoids reference to an alternative dispute settlement forum in circumstances where the respondent may be prepared to admit the claim but has not had an opportunity to review it. In nutshell, the respondent should have reasonable time frame in which to respond any claim. However it can not be an 'undated cheque' for the respondent/s to take indefinite period of time for response. Many standard forms are salient in this issue, however. If the respondent expressly rejects the claim by stating, for instance, that the sum claimed is not due under the contract, then a dispute has evolved.

Although some Court cases have established the fact that the prolonged silence or negotiations infer that the claim is not admitted, so that a dispute has already been begun, it is essential that the disgruntled party invokes the dispute clause accordingly. This is because the 'reasonableness' is a term relative to the context in which it is used. Meanwhile, the imposition of a deadline for response does not automatically curtail a reasonable time for response. Instead, it is important for the respondent to have an adequate time frame to make a fully fledged response, giving due regard to all the circumstances involved.

It was held in a Court case[99], that ill-defined claims will not give rise to a dispute even if met with an express non-admission. The extent of this ill-definition is such that the respondent can not sensibly respond to it. However, one would argue that the element of definition itself is a matter to be revisited by the panel of arbitrators, for instance. Another example is that the dispute settlement forum has the power to trial out, open up or investigate the dispute that is crystallized. Hence, a claim once rejected by the Engineer can be reframed and resubmitted directly to an adjudicator, with the intention that it will be investigated in mode of a dispute. The Engineer may well be having a defense against its direct reference to adjudication (by overtaking him), on the basis that it is a fresh claim that was not reviewed, decided or denied by the Engineer. A claim which had been referred to adjudication was different from the claim which has been made and rejected prior to adjudication and therefore no dispute had arisen in relation to the claims that are referred to adjudication as the respondent had not had an opportunity to consider and to respond to it[100]. It is therefore important to see whether the same claim is taken up at a later proceeding. Allied with this principle, one would argue and perhaps many tribunals admit, the fact that only the dispute referred to can be considered for investigation and then settlement, instead of a reciprocal claim submitted in response to the claim in trial.

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[99] Amec Civil Engineering Ltd v Secretary of State for Transport (2005) BLR 227

14.3 Doctrine of seperability

Settlement clauses have been attacked as void on the presumption that the contract as a whole was induced by fraud, rescinded or terminated by its own terms. This would frustrate the intent of the parties since the parties agreed in their contract to resolve all disputes by an alternative mechanism within the contractual machinery. To deal with this issue, arbitral panels and Courts have promulgated the 'separability doctrine'. The essence of this doctrine is that a settlement clause is an independent agreement, separate from the remainder of the contract in which it is contained. With this logic in mind, Courts have held that the settlement clause does not 'die' along with the contract, could not be rescinded with a rescission notice for the contract as a whole and was not invalid for fraud unless the arbitration clause itself was specifically induced by fraud. One of the implications of this doctrine is that the validity and effect of the settlement clause may be subject to local provisions than the other contractual provisions. Predominantly, the local law construes a contract, including any settlement clause.

14.4 Negotiations

A contract that caters to all eventualities is indeed rare, so that parties will have to turn to another side, willingly or unwillingly, for a settlement. This is why negotiation has become a day to day phenomenon, whether rights have been reserved under contract. Negotiations help produce an accord upon courses of action whilst bargaining for collective advantage. As long as the participation is in good faith, negotiations help crafting outcomes in satisfying various interests but parties who come with 'dirty hands' make a settlement difficult. However, negotiations are free with rational negotiators who can walk away from the negotiating table at will. If negotiators are having concerns for their counterparts, amicable settlement is possible notwithstanding what the contract expressly forbids or provides for.

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[100] Edmund Natal Ltd v RG Carter Ltd (2002) BLR 312

Courts imply an obligation to negotiate in good faith provided that certain conditions are satisfied. The concept of good faith is encouraged in many standard forms also. Codes of conduct governing many professions also promote the concept of 'fairness', 'reasonableness' and 'impartiality' at all times. The test of whether one has acted in good faith is a subjective one; the cases suggest honesty, and also the reasonableness in a given context. Also, there exists some mechanisms to resolve disputes if the negotiations broke down. They are called 'alternative dispute resolution' when Court of law is taken aside for a while. Amongst the benefits accruable are the saving of time and cost, better relationships, less job disruption, participation of all parties to control the outcome, and repute of the dispute confined within the parties.

Conflicts of interest are inevitable but a fair settlement is not. This is particularly because of barriers, strategic or otherwise, inherently involved in any type of negotiations. Every negotiation characteristically involves a tension, dilemma or what is otherwise called strain between individual interests and common interests. Parties prefer to maximize their own gains, basically commercial in nature, than the common interests. Another barrier arises as a result of agent's position since in many disputes, the principal do not negotiate or participate on their own behalf but instead act through agents who may have somewhat different opinions than their principals.

For instance, construction contracts involve Engineers to act as the Clerk of Work, Employer's agent, or Employer's representative. Quantity Surveyors and other consultants who are not a party to the contract between the Contractor and the Employer act in capacity of the Engineer's representative and the level of authority to take decisions has been kept to a minimum. Instead they act within the limits of delegation imposed under their individual contracts so that they simply follow the rules that govern contractual relationship, rights and obligations, and duties and roles of each party (Contractor and the Employer). This traditional approach could be sometimes a formula based stereo type one where the parties have to live with it up until the issues reach in the hands of the Employer.

Negotiations may fail *inter-alia* because of these barriers. One of the strategies is therefore the parties to create value and make the 'pie' bigger in which each party has a role to play in a synergistic way. With this vision in mind, the concept of value engineering has been recognized in many standard forms. It will perhaps widen the scope of thinking for better results in terms of cost and time, quality, workmanship and performance. It is therefore important that constructive options are considered in the light of both parties' interests and preferences. This suggests the significance of disclosure, openness, good faith and fair dealing.

It is therefore unlikely to see in those who come up with pre-conceived ideas to the negotiation table may ever contribute anything for mutual benefit. Limitations of the agent to negotiate on behalf of someone else may sometimes induce behaviors that fail to serve the interests of the principal itself.

14.5 The concept of fairness

A reasonable degree of cooperation is implied from both parties in the process of determining values and settling various issues. Further, the Engineer or his representatives where authorised may make their own assessment in absence of such mutual aid based on whatever *bona-fide* evidence, as available as befits the situation. However the Engineer is not supposed to act in *ultravirors* under any circumstance. For example, the Engineer has no power to vary the contract itself or overrule the mechanism in valuing varied work, whenever the contract is crystal clear in the esteem. Only the parties to the contract may alter the contract on mutual consent.

Disputes have long been referred to the Engineer, who was in a high-up position almost in every standard form of contract in two distinct roles; as the agent in protecting the interests of the Employer, and as the valuer in an independent capacity. Because of these two contrasting roles in the same project, the Contractors may have been suspicious of impartiality bearing in mind that the Engineer is remunerated by the Employer acting under a separate agreement with the Employer to which the Contractor is not a party. Later, FIDIC would have decided therefore that the role of Engineer acting in an independent role should be revisited. When the Engineer's decision has not been accepted by either party to a contract, the subsequent procedures have been usually addressed under 'settlement' clause. All in all, the Engineer's role in adjudicating disputes has been elementary. However, the sub-clause 3.5 of the New Red Book keeps the Engineer under a contractual duty to act fairly in all circumstances unless otherwise specified. For example, the granting of an extension of time requires the Engineer to follow the process set out in sub-clause 3.5; however, upon termination of the contract by reason of force majeure, the Engineer is not expressly required to comply with sub-clause 3.5 when determining the value of work done. In terms of liability, the Engineer becomes totally a figurehead of the Employer due to the fact that the Engineer should be deemed as representing the Employer. However, it is important that the Engineer does not act on his own opinion on matters such as valuations, defects, entitlements and particularly in deciding disputes referred to him. In this function, the principle that applies is that the Engineer is required to reach his decisions fairly within the contract. This is known as the *sutcliffe* principle[101] in demystifying the Engineer's function. Courts have clearly held that the compliance with the rules of natural justice is of those acts judicially such as judges and arbitrators, but not of the Engineer, who should essentially give decisions independently and honestly. The Engineer has to act fairly so long as what is tempered to the particular facts and occasion.

The introduction of adjudication as a new process of dispute resolution has awakened everyone on the concept of impartiality and natural justice. The extent to which these concepts apply to an Engineer in conventional contracts depends on the role. Generally, the Engineer is required to act impartially as between the parties, notwithstanding that the Engineer is retained, and paid, by the Employer. As Corbett[102] contends this stipulation 'was treated in previous conditions as a professional obligation of the Engineer.' Now the term 'impartiality' disappears. What is substituted is a requirement that the determinations of the Engineer shall be 'fair'.

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[101] Sutcliffe v Thackrah [1974] AC727

Much of the construction contracts involve the use of professional skill and judgment in deciding whether work has achieved a particular standard; for example workmanship of a finished surface texture. This is resolved by adopting the opinion or satisfaction of the Engineer as a yardstick. However, such statements of opinion or satisfaction are not measurable, final nor binding on the parties without express and clear provisions in the contract. The question remains as to what extent opinions, approvals and statements of satisfaction are binding on the parties. Although there is an element of subjectivity attached to in any complex technical issue, the quality or performance measures can be calibrated using sophisticated tools and advanced software.

The FIDIC forms do not expressly state that the works should be carried out to the Engineer's satisfaction. The Red form in which the Employer is responsible for design, except where specified otherwise, requires the Contractor to follow instructions and the contract procedures imply that consents and approvals will be given as the works proceed. Another argument is that the Engineer can not use discretion other than in forming his opinion or satisfaction. Some argue in contrary that it is discretion the Engineer can move onto taking impartial decisions and not necessarily the authority where the Engineer has nothing to do other than simply using authority. An element of idiosyncrasy is however inevitable in both ways. The old clause 2.6 makes express what is otherwise generally accepted as an implied term of the contract namely the Engineer must act impartially when performing his role as an independent certifier. All of the functions to be carried out shall be under the contract, without prejudice to the rights and obligations of the parties. What is important is to have adequate authority vested in the Engineer's regime.

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[102] FIDIC 4th Edition, A Practical Legal Guide by EC Corbett (1991)

14.6 The premise behind delegation

The Engineer shall delegate part of his scope of services to the Engineer's representative on the approval of the Employer. Any written instruction or approval given by the Engineer's representative to the Contractor within the terms of delegation shall bind the Contractor and the Employer as though it had been given by the Engineer. However, any failure of the Engineer's representative to disapprove work or material does not harm the Engineer's power to subsequently order pulling down, removal or breaking up such work or material of inferior quality.

A fair amount of tolerance has been usually vested in the Contractor to be more flexible in dealing with the matters within the subject delegation. The Contractor may express dissatisfaction, query any communication, action or decision of the Engineer's representative and refer such matters to the Engineer's attention. Of course under justifiable grounds, the Engineer may confirm, reverse or vary a decision taken by his representative. The Engineer may also extend the delegated powers from time to time within the terms of his engagement subject to approval of the Employer. Where this is done both the Contractor and Employer are to be provided with a copy of all such written delegations.

Unlike some other forms of contract, it appears no significant constraint on the scope of delegation in FIDIC based locally treated contracts adopted in countries where civil codified law prevails. The parties must carefully note the limitations of the powers delegated by making cross-reference to other parts of the contract document/s. The Engineer's representative is merely acting on behalf of the Engineer and can not exercise any discretion or independence in executing his role, which is basically supervisory. In a capacity of making recommendations on technical, commercial or contractual issues, depending on the reason of appointment, this role has taken a judgemental mode. However, the neutrality of both the Engineer's representative and the Engineer is often questioned, given that they both are at the Employer's payroll.

14.7 Determination fair by both parties

The Engineer is under a contractual duty to exercise a 'fair determination'. This relates to any kind of assessment on additional cost and time, valuation of varied work, clarifying ambiguities, approval of works and confirming satisfaction etc, all of which requires a professional approach. However, the term 'fair determination' is always debatable, probably because the Engineer moves from being an Employer's agent to being an independent advisor, in the same project.

Surprisingly, the Engineer could mean any person nominated to represent the Employer in the designation of Engineer. This 'contractual' Engineer plays the role of Employer's agent in some cases to protect the Employer's interests. An argument is that the Engineer must not be too remote and both parties are entitled to receive 'benefits' of the Engineer's expertise on all matters. The Engineer is therefore required to act fairly between and independently of the parties. However, the true Employer's agent has no independent function (acting as a professional exercising judgement in an even handed manner) but is simply an epitome of the Employer.

However, the role of certifier is different to and separate from the role of Employer's agent although these two roles are often combined in one person. This distinction is important in all cases when decisions taken by the Engineer can be at anytime contested. Once the role extends beyond acting solely as the agent for the Employer, and particularly when the role involves issuing certificates or approvals and requires expertise and discretion to some extent, the position becomes more complicated. Hence, it is necessary to look right through the contract documents to comprehend the four corners of the Engineer's role. In many FIDIC based contracts, the Engineer is a quality audit, a certifier and an adjudicator. This distinction is inevitable due to very nature of construction and a part of which might in some cases be delegated to the Engineer's representative, such as cost consultancy. However one commonality is visible, where an assessment, interpretation or judgement is sought, the clauses have been focused towards the Engineer for decision under 'determination' clause. The 'impartial' Engineer has returned in the New Red Book under the guise of this very clause that states the Engineer is under a contractual duty to exercise 'fair determination'. These clauses relate to assessment of additional cost and/or time, valuation of varied work, clarifying ambiguities, approval of works and confirming satisfaction.

14.8 The power of discretion

A key word to distinguish between the Engineer's roles is discretion. It seems to have incorrectly assumed that the Engineer has no discretion whilst acting as the Employer's agent. It is not difficult to mount an argument that every function of the Engineer under the contract involved discretion at varying degrees and affects the rights and obligations of the parties. Accordingly every function of the Engineer could be subject to obligation of impartiality with the fact that the Engineer would not be able to function as the agent of the Employer serving only the Employer interests. The Employer would therefore be obliged to specify in the contract where the Engineer is required to obtain specific approval rather than where not required to exercise Engineer's discretion. This might be achieved by listing certain 'specific' functions in part 2 of the conditions of contract in establishing limitations of the Engineer's discretion. Further, the existence of an obligation that the Engineer be impartial may give rise to an argument that the Employer is obliged to nominate as the Engineer someone who is capable of such impartiality. Accordingly, the nomination of an employee of the Employer who was obliged to take instructions would be in accordance with the contract.

A certifier cannot bind his Employer under the contract or vary the contract, unless these powers are expressly given to him. In FIDIC, the Engineer's power to certify is non-binding: he is usually only there to validate contractual claims for time and money and issue variation orders. So where a Contractor is entitled to a time extension for an excusable delay and is relying on proving a breach of contract to recover acceleration costs as loss and expense, he does expect the certifier to act fairly and reasonably and within the timescales in the contract for awarding a time extension. If the certifier actually fails to respond to a time extension request within the prescribed timescale, it will probably not amount to a breach of contract on the part of his Employer. In *Pacific Associates v Baxter*[103], it was held that a certifier owes no duty to the Contractor when certifying the works. The Contractor is therefore left to show that there is an implied term in the contract that requires the Employer to ensure the certifier performs his obligations properly. This is indeed a rare proposition.

14.9 Arbitral proceedings

Parties may become involved in arbitration on a Court order, contractually or by stipulation. In a Court ordered arbitration, the judge orders the parties to arbitrate the case upon certain aspects of their dispute. The Court itself sometimes sponsors and facilitates the arbitration process. Court ordered arbitrations are non-binding, meaning that the party whoever dissatisfied with the award of the arbitrator may request a new trial. Under arbitration by stipulation the parties agree to arbitrate after the dispute has arisen and choose the applicable rules and procedures to follow in the proceedings. Contractual arbitration is private and binding where the parties have already chosen arbitration. There is no appeal process in the traditional arbitration so that the award is final.

Parties may prefer to negotiate a single, master or umbrella arbitration agreement as many contracts exist in a bilateral or multilateral relationship. This master agreement can be incorporated into each separate contract by reference. Even if the arbitral clause will be somewhat different in some of the agreements, a master arbitration agreement can still be used, with slight modifications to suit any specific contract.

It is pretty obvious to have an arbitration agreement in writing. The first requirement for an arbitration clause is therefore that the parties' agreement must expressly state that they intend to resolve their disputes by arbitration. While this seems obvious, occasionally parties have agreed that any dispute shall be referred to an institution that administers arbitration proceedings, without specifically mentioning arbitration as the method for deciding their disputed issues. Institutions such as the ICC have other methods also for determining disputes namely conciliation, expert determination and pre-arbitral referee procedures. Thus, if the parties wish their disputes decided by arbitration, they should say so explicitly.

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[103] Pacific Associates v Baxter [1990] 1 QB 993

There are two popular accords entered internationally by member countries to regulate the conduct of their arbitral proceedings. The Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York Convention) and the Inter-American Convention on International Commercial Arbitration (Panama Convention) list the requirements that must be satisfied for an arbitral agreement to be enforceable.

Disputants choose arbitration because it is less formal than a Court hearing. In arbitration, the Engineer can be called as a witness to give evidence before the arbitrator. No decision or ruling given by the Engineer shall disqualify him from being called as a witness and giving evidence in arbitration. No party is relieved from any contractual obligation by the reason of arbitration being conducted during progress, meaning that the obligations of the parties shall not be altered by reason of the arbitration. Confidentiality is another emerging factor. Although confidentiality is often cited as an advantage of arbitration, most of the institutions' arbitration rules do not require the parties, other than the administrator and arbitrators, to maintain confidentiality of the proceedings, the award or any documents exchanged.

14.9.1 Will Courts overtake?

Courts will not usually trial out a case when there is an arbitration clause in the contract for which the parties have entered into. Instead, Courts will uphold the contract agreement and ask the disputants to invoke the 'dispute' clause for a settlement. Parties may mutually agree if they wish to refer the case straightaway to Courts. If one party wishes to refrain from arbitration, while there is a provision in the contract for arbitration, then it is entirely up to the party to submit valid grounds as to why it intends to bypass the arbitration clause. For instance, if a person is made to sign a contract under duress, and the contract contains an arbitration clause highly favourable to the other party, the dispute may still be referred to that arbitration tribunal. Conversely a Court may be persuaded that the arbitration agreement itself is void having been signed under duress.

14.9.2 Can any case be arbitrated?

Not all disputes are arbitrable. Cases that require judgments binding the general public are not arbitrable. Matters relating to crimes and family law are generally not considered arbitrable, as the powers of the parties to enter into an agreement upon these matters are at least restricted. In some disputes, some parts of a claim may be arbitrable and other parts may not. For example, in a dispute over patent violation, a determination of whether a patent has been infringed could be adjudicated upon by an arbitration tribunal, but the validity of a patent could not (as patents are subject to a process of registration, an arbitral panel would have no power to intervene in patent registrations based upon its determination). Some legal orders restrict the possibility of arbitration on the requirement of protecting weaker members of the public such as consumers, commuters etc. Also the Sharia matters in the Islamic context do not fall within the ambit of arbitration.

Accordingly, one of the issues that occasionally arise is whether the type of dispute involved is arbitrable – that is, whether under a given view of public order or public policy a particular species of controversy may be arbitrated or litigated in the Courts. Hence, it would be useful for the parties to follow a line of legal investigation on the applicable law to determine whether any likely disputes that may arise under their agreement are considered non-arbitrable.

14.9.3 Scott vs Avery clause

It is a principle of law established in a case [104] far back in 1856 that parties cannot by contract oust the Courts of their jurisdiction; but any person may covenant that no right of action shall accrue till a third person has decided on any difference that may arise between himself and the other party to the covenant. These provide either that no litigation shall be filed on the issues subject to litigation until an award has been issued on the arbitrable issues, making the completion of arbitration of some issues a condition precedent to litigation of others, or that the respondent's sole obligation will be to pay the pecuniary sum awarded in arbitration. These provisions are sometimes found in insurance contracts in which Courts may be authorized to decide liability issues while arbitrators to rule on damage claims. An express and clear provision in a contract that defers any dispute first to arbitration before any litigation is commenced has been common in construction contracts.

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[104] Scott vs Avery (1856)

14.9.4 Defining the scope of dispute

In construction contracts, parties define the scope of the disputes encompassed within the arbitration clause, using the term "all disputes" perhaps encircling all types of controversies, without exception. However, the phrase going on to say that 'all disputes arising under this agreement.' may then preclude arbitration of matters that are closely connected to the contract, but do not 'arise out of' it. If all potential disputes are intended to be encompassed, including tort claims, statutory claims, fraud-in-the-inducement claims, etc that may arise from the relationship established by the parties' agreement, then a broad-form clause can be drafted, such as by the following wording: 'all disputes arising out of, connected with, or relating in any way to this agreement'. The phrases "under this contract", "in connection with" and "in relation to" essentially limit the scope. The terms "in respect of" and "with regard to" have been afforded a fairly-wide meaning and the words "arising out of" have been construed to have the widest meaning. The latter gives the impression of an outward outlook.

14.9.5 Final and binding nature

Usually an arbitration award once rendered will be "final and binding". The term "finally settled" indicates that the parties intend the arbitrator's ruling to be final so that a Court will not try the case de novo. In this context, "binding" means the parties intend that the award will resolve the dispute and be enforceable in Courts. It does not mean that the parties are free to disregard, but the substance of the award will not be reviewed by the Courts. Parties express their intent for Courts to enforce the award without reviewing the evidentiary foundations of the award. The ICC and LCIA Rules provide that any award shall be "binding" on the parties, and by submitting to those rules, the parties waive their right to any form of recourse, to the extent such waiver may be validly made. The AAA International Rules provide expressly in clear terms that the award will be "final and binding" on the parties. Hence, the terms 'final' and 'binding' in the context of arbitration respectively purport the status of finality and legal enforceability, unless and until a Court may overturn the award.

14.10 A regime for multi party arbitration

It is not unusual for the Employer to take a disputed issue with the work of both the consultant and the Contractor. For instance, a dispute that would be seemingly connected to a design fault might be taken to be a matter of unsound construction. A defect may be attributable to two or more factors including poor design, bad workmanship and lack of supervision. The Employer can not begin a single arbitration procedure with both the consultants and the Contractor without an agreement on all parties, as the arbitration clause does not usually provide for a tripartite approach. If there is no general agreement the Employer will have no recourse other than to sue both the consultant and the Contractor. It would be unwise to commence separate arbitrations against the consultant and the Contractor as these arbitrations would perhaps involve the same issue of defect. Separate arbitration hearings by different tribunals may also result in two inconsistent findings on the same issue. Considering a case where the Employer joined the Contractor as a co-defendant, the Contractor applied for a stay of proceedings in favour of arbitration, as there was an arbitration clause in the contract between the Employer and the Contractor. It would therefore be undesirable to have two proceedings before two different tribunals which might reach inconsistent findings.

Although arbitration is frequently preferred to litigation (as it is seen in a more private basis allowing the parties to choose arbitrators with the relevant expertise to preside over their dispute), it becomes no longer applicable when the matter is connected with many parties who are not parties to the arbitration agreement. For instance, many contracts have no mechanism for a third disputant to occupy in the dispute process although it stipulates a gauntlet for the parties to strictly comply with.

As is the case nearly in every construction project, Contractors have no contractual relationship with 'outside' consultants deployed in the same project in order to rely on grounds such as negligence. Consultant in turn may sue the Employers on the basis that, if the consultant were found to be liable to compensate the Contractor, the consultant would in turn claim an indemnity from the Employer. The Employer may apply for an order that the consultant's claim against the Employer be stayed in favour of arbitration, as the contract between the Employer and the consultant contained a provision for arbitration. The Employer may also apply for the Contractor's claim against the consultant to be stayed in favour of arbitration on the grounds that both claims in the same construction project and that the Contractor's claim against the consultant involved matters that would affect and determine issues which the Employer and the Contractor had agreed to arbitrate. The Court may however take a view that, as both disputes are related to the same project, it would be unsatisfactory for the dispute to be arbitrated while the other was litigated because of the possibility of again inconsistent findings and decisions, unless there is a split clause authorizing the arbitration of certain disputes and litigation of others.

Another example is where the Contractor submits a claim for loss and expense based on late instructions by the architect. The architect may maintain the position that whilst the instructions could have been issued a little earlier, the Contractor's claim is grossly exaggerated and submitted in bad faith in order to recover some of its costs that were incurred on its own inefficiencies. If the Employer accepts the claim, it will need to obtain recourse from the architect. If the Employer fights the claim, it will need the architect's assistance to do so but will also need to obtain recompense from the architect if its challenge was to prove unsuccessful.

Examples in international construction are basically group-complaints that the work had not been done properly and contained one or more defects. An Employer may find himself in a position of having to choose between the parties responsible: a Contractor or a consultant. What it does not wish is to find, having launched an arbitration, that it fails (e.g. the defect is one of design and the Contractor is not liable) and it has to start a further arbitration against the consultant designer, for example. Similarly, a prospective defendant may wish to bring in another party so as that the finding is made which correctly apportions responsibility for the damage the subject of the arbitration, e.g. one consultant liable along with another consultant.

A sub-Contractor loses money for having to comply with an instruction which derives from the Employer and it claims against the Contractor. The Contractor does not, ideally, want the risk being liable to the sub-Contractor and have to start off all over again pursuing a claim against the Employer. This is particularly the case if the Employer's defence is that completion was delayed because of matters for which the Contractor would say was the responsibility of the sub-Contractor. So too with the question of interpretation on the provisions common to more than one contract or sub-contract.

Questions might therefore arise as to how arbitration can be extended to third parties, how separate arbitration proceedings can be commenced, may these different proceedings be consolidated and under what conditions, if they cannot be consolidated, then to what extent can one overcome the difficulty in several parallel proceedings, may a party to the complex contractual structure intervene voluntarily in the proceedings; when several defendants having divergent interests do not want the same arbitrator, how does one go about constituting an arbitration panel, and so on. This is why multi-party arbitration should have a satisfactory regime in international construction disputes. It will tie all the parties together in a dispute thus avoid them operate in the shadow of contract privity. In nutshell, it won't be a real 'alternative' to litigation if there is no ability to bring in other parties who were related to the dispute or to allow other parties to intervene in the dispute process.

14.11 Arbitration in a swift way

Construction contracts often include an express requirement for the parties to perform their obligations under the contract despite the existence of a dispute. The contract may expressly state that there is no right to suspend work or terminate the contract, although they are sometimes inconsistent with the local law. For example, under English law, there is a statutory right to suspend work for non payment which can not be excluded by contract. On the same token, the Employer may have the right to require a Contractor to proceed with the variation despite the time and cost consequences not having been agreed in advance.

Considering the nature of the issues that has been accumulated in a project since a long time, parties are keen to have some mechanism to get their disputes sorted out as earliest as possible. There is a concern about the escalating cost of arbitration, a doubt about the dual role of the Engineer and the propensity to obtain interim awards and temporarily-binding decisions with a view to facilitate uninterrupted progress and so forth, parties look for some thing that works faster, which is far from the subtleties of legal arguments, freed of the complexities caused by Court lawyering, where the parties would be protected of other confrontational approaches. In synthesis, something like what a well known French arbitrator uses to define as a gentlemanly way to solve disputes between gentlemen.

There is usually a term implied to the effect that the Employer will not prevent the Contractor from carrying out works in accordance with the terms of the contract. It is fundamental to virtually every contract that obligations are mutually dependent, *rebus sic stantibus*. This is sometimes referred to as the prevention principle and was an issue in the UK *Peak* case[105] on a defective work discovered before practical completion had been achieved. The Employer was responsible for long delays due its failure to approve a scheme of remedial works. A dispute arose concerning the Contractor's entitlement to an extension of time. Unfortunately, there was no specific provision included for granting time extension when the Contractor is delayed by the Employer.

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[105] Peak Construction (Liverpool) Ltd v McKinney Foundations Ltd [1970] 1 BLR 111

Where an act of prevention such as a delay in approving a remedial scheme causes delay, it is essential that the contract includes a provision for granting an extension of time. In the event a provision lacks the completion date flaws away and the Contractor is obliged to finish within a reasonable time. As a result of the completion date that is no longer applicable, the Employer was unable to apply liquidated damages even though the Contractor may be responsible for some element of delay to the completion. This is a classic example where swift solutions are required to minimise potential losses suffered by parties, instead of allowing 'loss to prevail where it lies'.

In almost all the foregoing circumstances, parties seek speedy, flexible and fair outcomes rather than indulged in too formal and rigid procedures. Time is more than money and parties have realized the importance of solving their conflicts of opinion at the site level, particularly when the contract documents are dead silent in some fundamental issues. This is where 'swift' arbitration comes into play in the context of construction. It should however be noted that some structural format is essentially a helping hand to regulate this form of dispute mechanism.

The formula is that longer the proceedings, the more they are likely to cost. If arbitrations can fairly be completed in a shorter period, the parties will get their result soon and the cost burden is less. '100 day arbitration' for instance is a procedure that runs on a short timetable, giving both parties an opportunity to present their cases initially. These include provisions for hearing lasting no more than 10 days, 7 days for closing submissions and 28 days for the award, as a thumb rule. If a period of more or less than 100 days is required, then this could be agreed by the parties, or by the arbitrator, if given the power to do so. However, a key point is that substantial and complex arbitrations can be dealt with far more quickly and efficiently than has traditionally been the case.

14.12 Adjudication

Adjudication is a process by which a presentation of a case is supported by evidence, together with counter argument/s to an adjudicator, who is undertaking an inquisitorial role in reaching a binding, enforceable decision. The 'decision' if not complied with is enforceable by the winning party in the Courts. Hence, adjudication involves referring a dispute to an adjudicator, who must issue a decision, usually within 28 days, subject to any agreed extension. The adjudicator's decision is then binding on the parties, and the Courts will enforce compliance, with no right of appeal on fact or law. However, either party retains the right to have the dispute re-heard in Court or arbitration, as appropriate.

First and foremost is that parties are generally happier with a short-form procedure, as equally highlighted in other forms, than with a full examination of every issue. Secondly, it is possible for disputes to be dealt with fairly, in a much shorter period than had previously been believed possible. Thirdly, the issues and questions prepared by the adjudicator together with any concerns for a settlement could bring time saving. This is the generic purview of adjudication. However, adjudication may not necessarily achieve final settlement of a dispute because either of the parties has the right to have the same dispute heard afresh in court (or where the contract specifies arbitration, in arbitration proceedings). Nevertheless, recent experience shows that the majority of adjudication decisions are accepted by the parties as the final result. It will almost certainly be quicker and less expensive than arbitration or litigation.

Natural justice is today a matter of concern in the practice of adjudication, as in other forms of settlement. It is about ensuring fairness as between the parties, that they know the case against them and are able to submit their own arguments and documents within the procedural framework and to have enough time to do so commensurate with the timescales of adjudication. It also involves the adjudicator ensuring that he or she acts impartially as well as having no interest in the outcome of the adjudication.

14.13 Amicable settlement

Parties have a choice in the way their disputes are resolved and administered in case they choose an alternative form of settlement.

They are no longer required to submit to the sovereign jurisdiction of the local or international Courts and absorb the procedural and evidential burdens. More frequently, by reason of the increasing popularity of ADR, parties prefer the option of retaining control in the whole dispute process rather than handing their fate over to a third neutral. This has resulted in a change in the manner the construction contracts are formulated. Many, including standard forms, promote that parties undertake a process of amicable dispute resolution than ever before.

Compared to other modes of dispute resolution, amicable settlement is preferred because of inherent advantages, one of which is that the dispute can be treated internally. Amicable settlement as a non adversarial approach is now being developed into a formal process in many standard forms. For instance, once a notice of dissatisfaction has been given under sub clause 20.4 in FIDIC Red book, both parties shall attempt to settle their dispute amicably before the commencement of arbitration. However, unless both parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which the notice of dissatisfaction was given, even if no attempt at amicable settlement has been made.

According to FIDIC guide[106] where this procedure was first appeared, the reason for the relevant sub clause is to give an express right for the parties to enter into negotiations when there is no reference to amicable settlement in the contract, despite of various bargains that would have taken place casually on ad-hoc basis.

It is unlikely that a party will refer a dispute to the dispute adjudication board (DAB) unless and until the dispute has been negotiated for some time, and without success. The time limits for the DAB operation already foresee up to some three and half months before a DAB determination is received from the DAB, during which the parties are still free to pursue amicable settlement. It is also possible that a minimum of 56 days for negotiations may lead the parties to significantly different views towards a fair resolution. Top of all, parties fed up with the stereo type process will eventually result in a stop-over settlement that may ease out hardship over the dispute. Parties under circumstances may not invoke the next step in the gauntlet because the issues can be easily sorted out within the contractual machinery itself.

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[106] FIDIC-1987 4th Edition

14.14 Mediation

Mediation is a form of resolution aiming to assist disputants in reaching a natural, practical and lasting consensus. Whether an agreement results or not, the parties themselves determine the outcome. Although the total idea behind mediation is to facilitate the parties to resolve the dispute on their own terms, the tendency is to fail mediation in construction unless the mediator actively intervenes in changing the dynamics of the conflict by contractual, financial and technical evaluations, as the case may be. The argument to contrary is that the mediator in doing so acts beyond what is truly expected in mediation so that the outcome is arbitral to some extent rather than consensual. However, this is not necessarily the case in the exception of construction where the key elements of mediation such as neutrality and impartiality can still be secured as long as the mediator does not step over the line into judgement.

Mediators eventually bring skills of naming, framing and reframing the issues and options with values and ethics. These altogether help mediators respond to the interests of the parties undoubtedly of course, without restrictions of the law. This 'responsiveness' shows how mediation as a process is informal, flexible and collaborative. A mediator owes a moral duty to guide the parties towards a settlement within the limits of neutrality and impartiality. Yet fairness and finality is wholly the disputants' prerogative.

14.14.1 Mediator's orientation

Love and Kovach (1996)[107] argue that 'evaluative' mediation is something of an oxymoron. The evaluation mediator in deciding for the parties is therefore not so different from traditional judges and arbitrators. In this way, mediators compromise neutrality leading to a settlement in favour of the party with the strongest legal argument. Another argument is that this tends to encourage the parties to be competitive and adversarial. Where a mediator provides an opinion which can seriously disadvantage one of the parties, that party may even withdraw from the mediation. If the neutral takes on an additional role, then the decision making process becomes mixed. Hence, the mediators must avoid such 'trash and bash' approach that blurs the line of demarcation between mediation and other ADR processes, they argue.

The map of mediation universe called Riskin's Grid has taken an attempt to define the mediator's orientation. Riskin (1996)[108] contends that the range of mediation practice encompasses a wide array of evaluative conduct by the mediator. If the parties require advice on the parameters of settlement based on law, industry practice, or technology, Riskin advocates the appointment of suitably qualified mediators with an evaluative orientation, which is then the right choice in construction issues. Conversely, if the parties believe that they themselves are better placed to develop creative outcomes, then a mediator with a facilitative orientation is fair enough. Although the intention is to define what can, does, and should happen in mediation, the proponents of purist 'facilitative' approach argue that the grid has tended to legitimize the evaluative activities under the label of mediation. They argue that the mediator should not answer the questions such as what is fair, what is amicable, how the Court may interpret etc. They say it is strictly the job of the parties themselves.

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107 Kimberlee K. Kovach & Lela P. Love, "Evaluative" Mediation Is an Oxymoron, 14 ALTERNATIVES TO HIGH COST LITIG. 31, 31 (1996).

108 Leonard L. Riskin, Understanding Mediators' Orientations, Strategies, and Techniques: A Grid for the Perplexed, 1 HARV. NEGOTIATION L. REV. 7, 23-24 (1996).

However much criticism has been levelled against evaluative mediation, Sam Imperati (1997)[109] sees evaluative mediation ranges from soft to hard; from raising options to advice on outcomes to apply pressure on a settlement. Further, Richard, Wilmot and Smith (1997)[110] argue the hallmark of a good mediator is the ability to provide a reality check without stepping over the line into judgment, which is a matter of competence.

14.14.2 Should mediators have immune?

As mentioned, mediation is a form of alternative dispute resolution aiming to assist disputants in reaching a natural, practical and lasting consensus. It is an informal yet structured process in which the mediator does not determine outcome but helps individuals work through and resolve on their own terms. Unlike a judge or arbitrator, the mediator does not decide who is right or wrong or impose a solution.

However, there is always a ha-ho on lack of care, misconduct and competency of the mediator, which includes, for example, a mediator failed to attend at an agreed time for mediation, or that mediator incompetence itself was what caused the termination of the sessions. Complaints about care also include that a party relied on incorrect advice given by a mediator, or the mediator failed to prevent the parties making an illegal, unfair or unworkable agreement or failed to disclose to a party that harm was threatened to them in circumstances where it would be reasonable to expect disclosure. Another complaint is also that a mediator made an unnecessary interference, applied duress or misled a party in some material way.

Absolute immunity enables a person fully avoid trial of a claim made against him so that he is not required to defend a claim by showing that he acted in good faith and without malice. Judges retain immunity for their independence in line with the policy to protect the citizen. This usually extends to others engaged in the administration of justice; witnesses, counsel, court clerks, the jury as well as court appointed mediators. As with judges, mediators are required to act impartially and independently, without fear and favour. Independence allows creativity and flexibility in approaches to an amicable settlement. Lack of independence makes the surrounding not sensible enough to mediate a case with a backbone. Hence, mediators should be free to conduct mediations as they think appropriate and should not have fear of being sued for an error of result or future harassment, otherwise mediators may be too rigid and legalistic in their approach.

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[109] Samuel J. Imperati, Mediator Practice Models: The Intersection of Ethics and Stylistic Practices in Mediation, 706 WILLAMETTE LAW REVIEW 33:3, Summer 1997.

[110] Construction contracts: law and practice. Wilmot-Smith, QC Richard (1997) Oxford University Press

The alternative mechanisms will also not fully preserve the mediator's independence. For example, indemnity insurance can be provided with indemnity for any damages awarded as a result of the suit. A mediator exercises a non-determinative role. It is the parties who choose whether to remain at the mediation and whether to enter into agreement. In theory, a mediator as a neutral cannot influence the outcome of the mediation and therefore there is no basis for mediator liability. The fact that the mediator is not responsible for the outcome of mediation is the very reason why they should not be liable for any actions based on the terms of any agreement entered into at the mediation. On this basis, it can be argued that mediators should be immune from any civil action arising from the substantive outcomes of the mediation for example, unfavourable bargains or loss of opportunity.

Immunity of mediators ensures finality of agreements reached in mediation. Parties are assumed to have freely reached agreement in mediation and the law favours upholding agreements. Precluding suit against mediators avoids time consuming attempts to reopen mediated matters at Courts if the parties' best interest is to avoid going to court in the first place. The premise is that mediators are not responsible for the substantive outcome of the mediation. Any agreements reached will have been freely entered into by the parties. Mediator immunity will prevent parties attacking the mediator's conduct as a backdoor way to unsettle a mediation agreement. Parties who are unhappy with the mediation outcome can refer to Courts. Some argue that no mediator should be held liable if parties agree to settlement terms that do not optimize their interests or fully capitalize on their rights. For example, a mediator cannot be held liable for allowing a party to accept a financial proposal that is less favourable to the other party when compared to some other standard.

People feel less confident about granting immunity to a mediator who permits a power imbalance amongst the negotiated parties. Mediator has no duty or capacity to realign or redistribute such imbalances from very practical point of view. Resulting in a liability claim due to mediator's failure to take action to redress the imbalance shows a gross misunderstanding on the role of the mediator. It is true that mediators, other than those attached to Courts, are not necessarily and always acting in a judicial capacity. Their role is facilitative, neutral, independent and sometimes evaluative. They are not judicial, judgmental, binding, deterministic, discretionary or ministerial. However the capacity is not always a sound yardstick to decide the level of immunity to a mediator as it varies with the case and on what parties really desire. Another argument is that absolute immunity would have been possible to anyone whose duty is integral with the judicial process and so are considered to be figurative arms of the judge, for instance court employees. The author does not deny this position but is it the only case? What about arbitrators! Are they always playing a judicial role?

As mediation is designed in part to encourage parties to settle their differences without reference to a court, it is undesirable to have a situation where the mediator is taken to court by challenging the conduct of mediation. If the administration of justice is the primary policy rationale behind conferring immunity on court appointed mediators, why can not the same rationale be extended to mediators operating away from the court? Although the role of mediator is different to that of a judge to an extent, the debate on immunity can not be denied upfront in terms of the model itself. Whatever model of mediation takes place; he needs absolute protection from civil suits leaving no room for anyone to contest the mediation outcome in Courts where the mediator becomes a witness in a lawsuit.

If absolute immunity is granted for court functions only, then the tendency would be some connection to court. It will limit mediation within the court premises. Further, an action against a mediator will require a court to inquire into what happened and what was said during the mediation session. It will undermine the parties' confidence in the confidential nature of the mediation process, which in turn may prevent the full and open discussions that are such an important feature of mediation.

Another question is why the mediator did not take affirmative steps to prevent a catastrophe when he was in a position to do so? When the parties contemplate in engaging illegal conduct or in breach of a memorandum of understanding, then why the mediator could not prevent? As a result of spearheading attacks while negotiations such as Beslan siege in Russia, mediators failed their mission and returned home. The mediation process does not require a formal determination that ascribes blame for past conduct as a condition precedent to shaping the future. Similarly, the mediation process is not compatible with imposing a legal duty on the mediator to reveal a party's improper past conduct or threats of future harm.

Let us consider the mediator who intervenes to stop a clash between villagers and military troops stationed close by. Assume that at least one party has engaged in improper conduct or threatens further misconduct. If the mediator is denied access to that information because the party refuses to reveal it to him for fear of being reported, then his efforts will be lost. If one believes there is still a value in trying to resolve such situations without relying on the use of force, then permitting a mediator to operate without exposure to legal liability is indispensable. Further, the trust which develops during the process allows the mediator to perform 'a bridging role'. The mediator should investigate not just the issues in dispute, but also the underlying conflict. Mediators have little chance of steering the parties to a settlement without understanding the hidden interests of the parties. Hence, a degree of persuasion is required in order to drive the mediation forward and to explore settlement possibilities from different angles.

Often the main argument against immunity is that it will deny access to compensation or other remedies to rectify harm. If a person suffers loss on negligence of a decision maker, then that injured party should be compensated unless there are clear policy arguments to the contrary. There are other legal provisions that can be invoked to provide protection for parties to mediation, for example designated procedures, disclosure requirements, code of conduct and the requirement to hold minimum qualifications. If the real obstacle to civil action is the difficulty to establish the causal link between the outcome and the responsibility of the mediator, then it is not a matter of immunity.

Parties dissatisfied with the court outcome may not sue the judge but they can appeal the decision. Candidates apply reassessment of results rather than challenging the basis of judgment in exams. There is no equivalent process for mediation because there is no determination to appeal. Further, the causative effect is so remote to prove, and referring mediated cases back in Courts would be of no use, so that an off-the-court action such as withdrawal of accreditation, license or professional membership would be more appropriate than a court action for mediator conduct, care and competence. The primary role of mediators is similar to what judges do when they preside at settlement conferences particularly in terms of exploring facts. The availability of absolute immunity would make this participation more attractive. For privately arranged mediation, the parties are presumably free to ignore mediation efforts and pursue any other remedies. The prospect of civil liability might also deter people from carrying out this social service, so that a perfect legislative coverage is important.

14.15 Courts vs ADR

Inter-alia the Courts' primary role is to define the existing laws and safeguard the public interests and social values. Courts interpret what the parties had in their minds at the time they entered into the contract. In contrast, ADR has come into more widespread use believing such a formal process has failed to afford real justice. This would mean that parties deserve something more than what Courts traditionally offer, if not mistaken, however ADR is not a panacea, anathema or a substitute to Courts.

The theory of ADR posits that the parties own both the dispute and outcome in that a shared solution will endure a better solution than an imposed one. The presence of the neutral gives the disputants a sense of fairness and a standard against which they can measure their own position. A neutral may bring new ideas, of course within an acceptable tolerance (for example, surveying is not an exact science) and assist the parties in forming a solution. Disputants may eventually "tailor" a solution they consider important and relevant. Conversely, the ways a mediator may adopt in framing out a case may be different to that of another mediator and similarly the outcome. This 'tailoring' should not however prejudice the accepted public norms, social values as well as the legal, ethical and equity principles existing in any society for years.

ADR has made an impact on the legal arena, both positive and negative. On the other hand, if ADR is extended to resolve difficult issues of public law, many argue that there is a real reason for concern. This is apparently because of the tendency to use non legal values to resolve important social issues while allowing private parties to determine public rights. Here, the question is how to be careful not to endanger what the law has so far accomplished. Courts refer cases on a voluntary or mandatory basis before getting to trial. For any ADR to be truly voluntary, Courts should use discretion only when the willpower of the parties' remains. The outcome would still vary on the Court's persuasiveness such as any sanction that makes participation and conduct of the process obligatory. This will restrict free choice of the disputants. On the other hand, Courts should be sensitive when power-imbalances exist, not necessarily to protect the parties' rights but to enhance enough room for self-determination.

When tapping the potential of ADR therefore Courts should first test the appropriateness, resistance and willingness prior to encourage and facilitate in the dispute resolution. It will help secure key characteristics of ADR such as participation in good faith, autonomy, choice and self determination. In contrary, mandating ADR without consent of the disputed parties or Court connected ADR with imposed rules such as strict deadlines may dictate the outcome and prejudice the aim of laissez-faire settlement.

Courts resolve disputes via a binding process by applying legal and equitable principles to findings of fact. The Court system is governed by quite strict rules of pleading and of evidence. This system is by and large backward-looking in the sense the outcome depends upon discovering the truth about something that occurred in the past. Subject to rigid procedural and evidentiary rules, the Courts provide legal answers to questions of entitlements and of rights. The Court's focus on deciding questions of fact and law often leaves other interests, options, and solutions unexplored. Hence, the needs that are satisfied by the Court 'model' are not necessarily the needs of the parties. The Courts 'resolve' but they do not 'solve'. Courts duty is to find who is right and wrong under prevailing legal conditions. Hence, the Court system has not been responsive to the needs of the disputants for a solution, not a resolution. However, the trend is to blend these two flavours, Court and ADR, as an approach for the disputants to seek justice.

However, boarder line cases are likely to be suitable for ADR meaning that the legally strong cases are less suitable for ADR. Hard cases[111] that have no settled rules to dictate the outcome can be heard in the Courts since they may require either construction or interpretation of the law. Cases that are involved in public interests are less suitable in informal private processes. ADR will again be an inferior brand of justice in highly contested crimes. For instance when a female employee becomes a victim of a sexual assault committed by his co-worker, a mediator might only help parties develop terms to avoid occurring again. In nutshell, the disputes which are incapable of private or informal determination should be reserved for Courts. But how to segregate cases from hard to soft is a matter of fact.

Public policy is the body of fundamental principles that underpin the operation of legal systems. It addresses the social, moral and economic values that tie a society together. In performing this function, Courts observe critical values of any legal system which are reflected in authoritative texts such as constitutions and various statutes. A judge considers the public policies to determine whether a rule should be applied to a specific dispute. If laws are applied too mechanically, the law cannot keep pace with social innovation. Similarly, if there is an entirely new situation, a return to the policies forming the basic assumptions underpinning potentially relevant rules of law identifies the best guidelines for resolving the dispute. Over time, these policies evolve, becoming more clearly defined and more deeply embedded in the legal system.

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[111] Daniel Misteravich, "Limits of Alternative Dispute Resolution: Preserving Judicial Function", 70 U.Det.Mercy L.Rev 46 (1992-1993)

14.16 Court's position in loss and expense

Courts have been largely involved in disputes in connection with loss and expense. Courts first uncover the contract and see how it is made up of. Contracts eventually define both primary and secondary obligations. Secondary obligations arise as a consequence of a failure to carry out primary obligations. Parties are free to decide for themselves how to allocate those secondary obligations. Where there is a failure to perform those primary obligations (i.e., the performance obligations in the contract), there is a breach of contract.

Lord Diplock[112] observed that 'the secondary obligation on the part of the contract breaker is to pay compensation to the other party for the loss sustained by him as a consequence of the breach.' Also, a court should not assume that either party is likely to commit themselves to unfair or unreasonable terms. So where they have agreed the allocation of risk, the price must be taken as reflecting that allocation and that therefore would be little scope for the court to unmake the bargain. The principle is that a party who can look after itself enters into a commercial contract and, with full knowledge of all relevant circumstances, willingly accepts the terms of the contract which provides for the apportionment of financial risks of that transaction. Lord Diplock says the court should be slow to interfere, therefore. The apportionment of financial risks include the provision of LD for delay, inserting exclusion or limiting clauses, and making provisions for loss and expense including consequential losses to be paid in certain defined circumstances. In effect, the parties are allocating risks between themselves.

Where the Courts have to decide what these clauses which allocate secondary obligations mean, they in fact, return to the civil or common law principles to decide this. The question of how the parties have allocated risk then depends on whether the loss falls into the two limbs of *Hadley v Baxendale*[113] in Courts where common law principles are adopted. For instance, liquidated damages fall into the first limb because it is a direct loss. The same applies to provisions for loss and/or expense (and probably for compensating events) as well. Consequential losses fall into the second limb unless they are in fact a direct loss.

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[112] Photo Production v. Securicor Transport (1980).

[113] Hadley v Baxendale (1854) 9 Exch 341

However, some Courts adopt the slip rule, without prejudice to foregoing principles. Slip rule is a rule by which a Court can very exceptionally reopen a published order but only to correct an accidental slip or omission such as a clerical error. Jurisdictions largely vary as to the extent of discretion in their respective rules of procedure in applying the slip rule. Hence, the slip rule is to ensure that clerical mistakes can be corrected without the need for an appeal. It cannot be used to redo an application. The application to correct an existing order cannot go to a matter of substance unless the error is clear from the record.

14.17 Expert witness

Like in fingerprint in criminal cases, the work of accident analysis, intellectual property issues and medical negligence cases are typical civil examples where expert witness is taken place. The expert witness function prevails equally in the construction field, where the disputes invariably involve professional negligence, delay impact analysis, prolongation costs and the like.

A key distinguishing feature is that the expert is free to use his own expertise to investigate the question that has been referred to him, taking account of the submissions of the parties as he sees fit, whereas judges and arbitrators are required to decide on the basis of evidence made by the parties. This is one of the greatest strengths of expert involvement, particularly when the issue is technical or scientific by nature. Therefore, the expert is not just appointed to hear the parties' various contentions and to select between them, but to investigate the facts and to apply his expertise to decide the answer to the question that has been referred to him.

Accordingly, the judge or tribunal can call upon experts to evaluate a case, technically, financially or otherwise in order to provide the Court or the tribunal with an unhesitant knowledge on the facts and issues it is judging. There is no limit to the number of fields that individuals can be experts, for instance even a chemist specialist may be called to the stand if a certain kind of liquids was found at a crime scene. However, the use of expert witness is sometimes criticized because in civil trials, they are often used by both sides to advocate differing positions, and it is left up to a jury of laymen to decide which expert witness to pick up.

It is also now common in international construction arbitrations to find that quantity surveyors have been deployed from a very early stage in preparation of claims. Often such consultants provide individual inputs in certain aspects of the dispute, such as eligibility and quantum. Sometimes these consultants also appear as the parties' experts, providing reports and giving evidence at hearing and may eventually provide fake testimony in order to convince a jury, although indeed a worse case eventuality. However, these consultants must be distinguished from experts unconnected with the parties such as specialists, with a reputation for their expertise in a specific area.

The purpose of expert witness is to tell the tribunal something that it is not sure about, i.e. what the reality is. It is not to tell the tribunal the facts or to argue the case but to demystify the specific issues that may be sensitive to the outcome of the trial. For instance, an expert might be called upon by a tribunal to give opinion as to whether a particular crack is related to a failure in structure itself or merely a workmanship, or whether it is due to a design defect, lack of supervision, unsound construction or a combination. This is why the expert approach is in many cases retrospective or forensic in nature. Indeed, there should be a clear line between the facts which the expert considers relevant for the purposes of forming an opinion and the facts which are not consistent with various hypotheses. Where there is no real doubt that an event occurred but there is no real evidence to prove it or the sequence of such events then expert evidence can assist the tribunal to decide what probably happened. Thus it is necessary to establish the actual or presumed knowledge of the tribunal as it will affect the reception of expert evidence, he argues.

An expert, who is truly independent, will provide a candid answer to the question which the expert has been engaged to answer. Expert opinions should be independent regardless of the pressures of litigation also otherwise a judge may reject expert evidence on the basis that it does not come from a pure independent source. If the experts are not properly independent then they will be mere advocates and their opinion will not count for as much, if they count for anything. Recently there has been a tendency to treat expert evidence as only admissible or credible if it comes from an independent source. In rare cases, experts can also give factual evidence, such as the evidence of the expert which is of what he or she has observed of the defective structure for example. Opinion evidence setting out what the expert herself would have done in a given situation is not however admissible. Therefore opinion which relate to day today life or matters of observation by layman does not fall within the definition of expert evidence. Also the Court will not receive expert evidence relating to legal expertise as the judge is taken to know the law better than anyone else.

Hence, the essential qualities of an expert include not only breadth and depth of relevant experience but also an ability to be self-critical so as to produce a balanced judgment. The expert must therefore be able to use his expertise, critically evaluate a given case, show both merits and demerits in application, and help the tribunal understand the pros and cons under each scenario, without switching onto a counsel. The need for such independence is now brought home to an expert by the new obligations set out in CPR, which stands for Civil Procedure Rules, which now apply in the Courts in England and Wales. As such, it is the duty of an expert to help the Court on matters within his expertise and this duty overrides any obligation to person/s from whom he has received instructions or by whom he is paid. Accordingly, an expert's report must comply with the requirements set out in the relevant practice direction. At the end of an expert's report, there must be a statement that (a) the expert understands his duty to the Court; and (b) he has complied with that duty. This means that there should be no expert evidence at all unless it will help the Court and more than one expert in any one speciality unless this is necessary for some real purpose.

Another aspect is that whether a party has any obvious right to an expert? Generally, the Courts have some restrictions on the deployment of expert evidence. Some rules provide that no party may call an expert without Court's permission. When a party applies for permission under this ruling he must identify (a) the field in which he wishes to rely on expert evidence and (b) where practicable the expert in that field on whose evidence he wishes to rely. In case the permission is granted, it shall be in relation only to the expert so named. For example, if a renowned Engineer is appointed as arbitrator whose background is fluids, it would be unnecessary for the parties to adduce an expert on fluid mechanics. However, if the subject-matter is outside experience of the tribunal then the parties must demonstrate that the tribunal will need that evidence. Although the expert evidence is there to inform the tribunal and, of course, there will be some cases in which the parties will wish to ensure that the tribunal is up to date with the latest knowledge. For instance, the arbitrator may be one with a quantity surveying background who had spent the whole of his professional life on claims related to building projects but never had to work on off shore gas projects, so that it was obviously useful to have experts.

Courts therefore sometimes defer granting permission to call an expert until it is clear for what purpose expert evidence is required. In many cases the need for the expert and the precise point upon which expert opinion will only become apparent either after discovery or even after the exchange of primary witness statements of fact. The expert owes a moral obligation to bring back the right path in case he comes across that the motion is on wrong track as far as the subject matter under consideration is concerned. Experts must not be placed in the invidious position of being criticised for having asked (and answered) the wrong question. If there is more than one way of looking at a subject then both questions should be posed to see the extent to which the answers may differ. The expert should leave it to the tribunal to decide the question on the basis of the reasoned opinions. Indeed, an expert has no authority to compromise or to dominate the sessions but they owe a moral right to ask the Court for directions in cases where necessary information is not made available to them. The expert is a servant not of the Employer but of the Court or tribunal and it usually confers immunity from suit.

Although the Courts and other tribunals have long controlled the manner in which experts carry out their functions of meeting, reporting and, ultimately giving oral evidence before the tribunal, a more systematic approach to such control and regulation can be dated from the landmark case of *Ikarian Reefer*[114]. In that case Mr. Justice Creswell of the Commercial Court listed seven duties and responsibilities of expert witnesses in civil cases, emphasising that the evidence should be independent, unbiased and related to matters within the expertise, stating the facts or assumptions on which his opinion is based, and considering facts which could detract from his opinion. An expert should state when a question falls outside his expertise and if data available is insufficient. If, after exchanging reports, he changes his view, this should be communicated to the other side and the Court and where he refers to any documents these must be provided at the time of exchanging reports.

14.18 Dispute boards

In place of the Engineer, it was intended that the pre-arbitral decisions on disputes would be made by an independent board of construction experts, known as Dispute Adjudication Board (DAB) or Dispute Review Board (DRB). As such, it was hoped that these boards avoid problems associated with the involvement of Engineer traditionally in the settlement process.

As a result of prior knowledge gained by regular site visits, dispute boards (DBs) are able to deal with disputes quickly as they arise. Generally DBs are acting within the time restraints however, in most cases this is more than offset by the advantage of a decision being provided speedily. In complex claims, the DB may interpret the issues, decide matters on principle and refer back to the parties to establish quantum. Although either of the parties may reject the decision of the DB and proceed to arbitration, the arbitrators are unlikely to overturn the DB's findings in some cases. Another concern is that the DB prevents disputes build-up by continuous follow-up and intervention as soon as disagreements occur. Unlike arbitration, DBs are not generally undertaken within the confines of arbitration acts or subsidiary legislations. Instead, they closely resemble expert inputs and accepted norms of the building trade, particularly when the contract is in a silence or dilemma.

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[114] National Justice Compania Naviera SA v Prudential Assurance Company Ltd (Ikarian Reefer) [1993] 2 Lloyd's Rep 68

The DB can, with the agreement of the parties, be asked to give an advisory opinion also. This would be similar in nature to a judgment on a preliminary point in arbitration. The advisory opinion can be used when the parties need guidance on a technical matter that is preventing a further dispute. By referring this interpretative matter to the DB further hearings on the dispute may be unnecessary. When a dispute does arise, it is given early attention and addressed contemporaneously. This avoids the commonly encountered situation of the Engineer as well as arbitrator being too busy to address a voluminous claim. But no one can say all these things never happened alone with the Engineer. Because of the familiarity with the project, facts are better understood by everyone, perhaps a must when administering the dispute. This is important when in most projects; the same staff rarely remains till completion that deprive the arbitrator the benefit of their first-hand know-how of events. With such individuals on hand, greater certainty prevails and the materials relevant to the issue can be easily dug out.

However, DBs are not perfect in all respects when compared with arbitration. Firstly, as more and more DBs are appointed under each contract package for instance, there could be interface issues that waste time and money and more over the possibility of having contrasting decisions. Secondly, the dispute board members have to be selected at a time (in permanent boards) when it is not clear what kind of disputes will arise and what kind of expertise will be required to resolve them. This especially applies to the selection of members with an engineering background. If the dispute board is a permanent one and set up before any dispute is emerged, it can happen that later on it has to deal with disputes on technical issues for which the Engineers on the dispute board are not really qualified because their expertise is on other subjects. Since the aim of the DB is to provide a mechanism to ensure a speedy method of dispute resolution, both fair and cheap, all parties involved must ensure that DB procedures do not turn out to be overly complicated, otherwise the DB route could suffer the same fate over the time as arbitration.

It is clearly preferable for the DB to give unanimous decisions. Whilst provisions may allow the DB to give majority decisions with minority opinions, this would be unsatisfactory. If differing views are held by the members, these can often be incorporated within the decision without adversely affecting the final outcome. Unanimous decisions engender confidence in the dispute process and are more likely to result in a settlement. Under some DB provisions, arbitration is only permitted in the event of a non-unanimous DB decision. An agreement may state categorically that the decision of the DB shall be treated as an expert determination and is final. However, a question arises as to whether the decision of the DB can be enforced contractually. It is likely that the Courts will enforce the DB decision pending arbitration unless the Court is convinced that the arbitration can commence immediately. If there is no such express provision in the contract that the DB decision will be binding in the interim, even if a reference to arbitration has been served, it will be hopeless.

Many disputes concern 'non-absolute' matters and, in such cases, the DB can devise solutions to avoid 'win-lose' situations. Working relationships are less injured and site-level partnering can continue. Even if the DB decision is contractually 'non-binding' it does not appear to impair the efficacy of the decision. There are two main reasons for this; first that if the DB's decision is admissible in later proceedings the parties know that an arbitrator will be greatly influenced by a decision (on the facts) given by a panel of experts. Secondly, there are swings and roundabouts. It is unlikely that over the course of a large project the DB will always find in favour of the same party. As such, it does not harm when facts are disclosed to arbitration. It will perhaps reduce time and money by avoiding repeating historical background of the case. This is why an arbitral tribunal should be allowed to know of the extent of the work of such a body.

When a dispute is referred to the DAB under the clause, it gives a decision on that dispute and, thereafter, if a party is dissatisfied with that decision, it gives a notice of dissatisfaction as to that same dispute. Whatever other disputes there may be between parties, none may be arbitrated unless it has gone through the process. Accordingly, if the arbitrators embark on any other matters, without the parties' consent, they will be exceeding their jurisdiction and, hence, their award may be set aside. If the DAB to decide whether there had been a variation and also its claim for an extension of time which is itself based on the notional delay had there not been acceleration (but not any other of claims as it reasons that their quantification will depend on the extension of time ultimately granted), a question arises whether all claims can be taken up at arbitration. This is because, quantification is followed by entitlement on one hand and each dispute must have passed through the six-step procedure in Clause 20, on the other hand. The fact, for example, that the parties are already in arbitration with respect to certain disputes will not relieve the claimant (or respondent) from having to refer through this six-step procedure in any other dispute.

It is clear that dispute review boards are to stay as an alternative means of resolving disputes and are particularly suitable for use on major construction projects. However, given the relatively summary process, parties rarely choose dispute review boards as the only mechanism for resolving disputes. Arbitration is generally retained as the fallback even if in practice the parties may be prepared to live with and abide by the decisions of the dispute review board without recourse to arbitration. Where the financial implications are substantial, or where there is a sense that the dispute review board has tended to 'split the baby' rather than rigorously analysing the contractual position, a party may want to refer the matter to an arbitral tribunal that will approach the issues without the benefit of knowledge of the full history of the project, for better or for worse.

14.19 A hypothetical dispute

The Contractor, a company registered in Listern, (hereinafter called "Claimant" or "Contractor" as the case may be) undertook to construct a 40 km long road to link the capital and new airport terminal in the Republic of Zealand under a Contract administered by the FIDIC Conditions (1999 Red book). The scope of work includes design and build of bridges across the river as well. The Contract sum was US$50 million, of which 50% was payable in Zealand Follicles (ZF) and 50%

in US$. (At the date of the Contract 1 US $ = 50,000ZF.) The Client (hereinafter called "Employer" or "Counterclaimant" as the case may be) is the Minister for Public Infrastructure. The Engineer is the Chief Engineer of the Roads Department of that Ministry. The Contract period is one year and accordingly, the scheduled completion is 31 May 2003, just in time of the 40th National Independence Day on 1 July 2003. Delay damages are set in the Contract at US$ 350,000 per week. The subject matters of the dispute are as follows.

On 1 April 2002, the Contractor finds that, if it followed the details on the Engineer's drawings, the surface of the road would be liable to seasonal flooding from the river. It therefore needs to know whether the level of the road is to be raised, as it will affect its design of the bridge. The precise level of the road was only shown on drawings issued after the Contract was signed. They were issued by the Resident Engineer (hereinafter called RE) appointed under Clause 3.2 to exercise every power of the Engineer (other than under Clauses 3.5 and 20).

On 1 May 2002, the RE replies stating that the risk of flood is of the Contractor and it must do as it thinks fit. The RE refers to a provision in the specification which says that on completion, the works are to be left in a perfect condition. The Contractor says that it will not raise the road or alter the ramps without an order from the Engineer. On 1 June 2002, the RE issues modified drawings which increase the height of the road and says that, although the Contractor must build the road in accordance with the revised drawings, they are being issued under Clause 3.3 and not under Clause 13 without prejudice to the right to argue that they were never needed, as it was the Contractor's responsibility under the Contract to solve the problem since the bridge would not be fit for its purpose if it could not be reached safely.

Before complying, the Contractor in a letter on 8 June 2002 warns the Engineer of the likely additional cost (US$ 500,000) and of the additional time (3 months) that the new work will take. The Contractor says that;

1. Raising the height of the road will cost at least $ 300,000 and will add 3 weeks to the duration of the project;

2. It will now be necessary to revise the design of the bridge and the ramps and that will take 3 weeks to complete and cost $ 100,000 in staff time;
3. It will then take another 4 weeks to order and obtain new steel and reinforcement etc which will cost another $ 100,000 or more;
4. At least 2 weeks will be needed to construct the bridge and the ramps to the revised design. It says therefore that it will do the work only on the basis that it will be paid for the changes in US$ only and if it is given an extension of time until the end of August 2003.

The actual cost of the change in height and its consequences is very large (US$ 2 million). The Contractor works night and day as it treats the letters as a request to reduce the 3-month forecast. Also, the local material prices have gone up in 3 times. The Contractor also had to pay even more to get the suppliers and its labour force to work overtime. The steady devaluation of the ZF means that it is now about 75,000ZF = 1 US$. Everybody (except the Contractor's own local staff) now has to be paid in US$. The six weeks' overrun cost the Contractor $150,000 per week in prolongation. Nevertheless, the completion of work has been delayed by only 6 weeks.

Although the road surface was complete by 1 July 2003 and the road itself was used by the public satisfactorily, the Ministry officials were very displeased. The safety barriers had not been finished and as a result the people were able to get too close to any VIP motorcade to the airport. Accordingly, the Minister ordered the Employer's in-house staff to deduct delay damages and act under Clause 15. The Engineer therefore deducted US$ 4 million (as a result of using a calculation supplied to him by the Minister's office). The Contractor might otherwise have been paid US$ 3 million plus 150,000 ZF.

Before completing the works, the Contractor had submitted a claim for an extension of time based on the recognition of the RE's letters as a variation, and for the recovery of its additional costs. It gets no answer and so it asks the DAB to decide whether there had been a variation and also its claim for an extension of time which is itself based on the notional delay had there not been acceleration (but not any other claims as it reasons that their quantification will depend on the extension of time ultimately granted). The members of the DAB meet in Zealand after completion and hurriedly decide that there was a variation and that the Contractor is entitled to an extension of time until 1 June 2003. The Contractor duly gives notice of dissatisfaction. Amicable settlement starts promptly but after 2 days, although the Contractor offers to reduce its claim by 20%, the Employer wants a reduction of 50% but it also offers to give up all its claims. The Contractor further disagreed with the Employer and at the end of the 56 days on the date of notice of dissatisfaction, Arbitration started in accordance with the rules of National Court of Arbitration.

In its Answer to the Request for Arbitration and in a Counterclaim, the Employer contends that;

1. There had been no genuine attempt to resolve the dispute; it produces incontrovertible evidence that the Contractor was actually willing to accept a reduction of up to 40% for a quick settlement; the Arbitration was started prematurely and the Tribunal should decline to proceed, terminate the proceedings by an award, and thus require the Contractor to resume negotiations immediately.
2. Alternatively, the DAB was wrong to decide that there was a variation; and that the Contractor should have completed by the original date for completion.
3. The Contractor should also now be made to pay $10 million as its conduct is an affront to the Honourable Minister and it must pay exemplary and punitive damages.
4. The Employer denies all the claims lodged by the Contractor.

The Contractor contends in a further submission by way of reply that;

1. The Arbitral Tribunal has jurisdiction to proceed since the Employer has not said that it too is, or would have been willing to settle at 40% and it can decide all the Contractor's claims

since the DAB was so impatient that in reality it had failed to decide;

2. However the Tribunal has no jurisdiction to decide that there was no variation or that the Contractor is not entitled to an extension up to 1 June 2003 as the Employer gave no notice of dissatisfaction with the decision of the DAB nor had it asked the DAB to decide any of its claims.
3. The Contractor claims the extension of time originally sought and all its losses.

With the agreement of the parties, the two cases related to each such request respectively were jointly taken up by the Arbitration Tribunal. The relief sought by each party are that;

1. The Claimant seeks US$ 3 Million plus ZF 150,000 as the recovery of loss and 3 months extension of time till 30 June 2003, as originally sought.
2. The Counterclaimant needs to impose US$ 4 Million as liquidated damages plus US $10 Million as exemplary and punitive damages.

While performing the above Contract, the Claimant claimed to have been confronted with numerous problems as a result of Engineer's fault and silence. The Claimant claims that it has always performed under the Contract with the utmost diligence and in good faith and has always endeavoured, during the course of the work, to overcome the obstacles placed by the Counterclaimant.

1. The Contractor contends that the Employer should have made available with the tender document data on hydrological, sub surface and climatic conditions from investigations he has made or made on his behalf relevant to the works concerned. Making his own interpretation of data such as water and tidal levels, nature and extent of work, sources of risk and contingencies and any other circumstances that may influence the tender price, the Contractor argues that the tender price is based on the data, which was drawn and reasonably available at the time of tender and the conditions have differed to what

he has obtained, interpreted and catered for in the tender so that he is entitled to additional payment.

2. In accordance with the Clause 1.9, the Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall include details of the necessary drawing or instruction, details of why and by when it should be issued, and details of the nature and amount of the disruption likely to be suffered if it is late. However, the precise level of the road has been shown in drawings issued only after the Contract is signed. Although the Contractor notified accordingly, it took almost 2 months to receive the Engineer's modified drawings (from detection of error on 1 April to receipt of drawings on 1 June).
3. As defined in Clause 13.1 (Right to Vary) any changes to the levels, positions and/or dimensions of any part of the Works (road portion in this case) are a variation that apparently amounts to an additional cost of $ 300,000 and an additional period of 3 weeks.
4. Design of the bridge across the river and the ramps either side is a part of the Contractor's scope. Any modifications as a result of levels supplied by the Engineer (subsequently found to be incompatible) would result in abortive work. In this regard, the additional amount incurred is $100,000 and the additional period of time taken is 3 weeks. As per Clause 1.8, if a Party becomes aware of an error of a technical nature in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error. The Contractor has notified at the earliest practicable opportunity and the only option available to the Contractor was to set out the Works in relation to original points, lines and levels that were made available to-date. Hence, the Contractor contends that the Employer shall be responsible for any error in these items of reference.

5. As per Clause 8.4, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for Completion to the extent that completion for the purposes of Sub-Clause 10.1 [Taking Over of the Works and Sections] is delayed mainly by substantial change in the quantity of an item of work included in the Contract (bridge as well as road). The Contractor considers him to be entitled to an extension of the Time for Completion, and gives notice to the Engineer under Sub-Clause 20.1 [Contractor's Claims]. A Party cannot however benefit from its own breach of Contract to the detriment of the injured Party. A consequence is that the Employer cannot hold the Contractor to a specified completion date if the Employer has by act or omission prevented the Contractor from completing by that date. Instead, time becomes at large and the obligation to complete by the specified date is replaced by an implied obligation to complete within a reasonable time.
6. It is generally accepted on principle that the Contractor shall be compensated over any unabsorbed or under absorbed overhead component in a delay beyond his control. When construction is delayed by Employer-caused actions, it is fair to make an equitable adjustment to the Contract in terms of cost and time. The Contractor argues that he is entitled to recover when there is pure owner-caused delay. (Work stoppages due to design revisions, suspension or interruption, slow responses to requests of information etc). The Contractor argues that even when the Employer has disturbed progress to items off the critical path so that the Contractor is not delayed in the completion of work, still the Contractor has a valid claim on the cost of wasted or increased overheads incurred as a consequence of the disruption, which shall be calculated in proportion to the values of preliminary bill items.
7. The Contractor argues that he has an absolute discretion as to how the work is planned and executed as long as completed on time. Whilst the Contractor is required to

submit a program for the execution of Works, it in itself does not mean that there is a contractual obligation to adhere to that program. The Employer should also ensure that the Contractor is provided with all necessary information at such a time as to enable compliance with the program.

8. The Contractor argues that he maintained sufficient labour, material and plant ready for work in accordance with the Clause 14 program. If the Engineer finds the existing rate of progress is too slow to ensure due completion (running behind the schedule), he shall so notify the Contractor in writing. The Engineer may approve the necessary steps to accelerate the progress proposed by the Contractor. The Contractor has constructively accelerated even without an order from the Engineer, but a claim by the Contractor that he was entitled to accelerate to achieve original completion date when in fact an extension should have been granted. The project has been substantially completed by 1 July 2003 so that the actual delay is by only one (1) month, because of the mitigatory actions taken by the Contractor in good faith although the reasons fell outside the Contractor's control.
9. As per Clause 13.8, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. As such, the Contractor should be compensated under the subject Clause. The purpose of a fluctuation Clause is to provide a mechanism for reimbursing Contractors for changes in input prices over which they have no control at all. This Clause therefore does cater for any adjustment in respect of externally imposed fluctuations in prices of materials, labour; plant etc with the exception of those emanating from changes in legislation promulgated after the Contract is made.
10. The amount expended for the purchase of additional steel reinforcements for the bridge and ramp is $ 100,000. It takes 4 weeks to bring the materials available to site.

11. The cost on additional quantities is inevitable. Changes to the quantities of any item of work included in the Contract are consequential to the change in design. The final quantities can be taken jointly as per Clause 55.
12. As per Clause 14.15, the Contract Price shall be paid in the currency or currencies named in the Appendix to Tender. If no rates of exchange are stated in the Appendix to Tender, they shall be those prevailing on the Base Date and determined by the Central Bank of the Country. This is simply beyond the Contractor's control.
13. As per Clause 13.4, if the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.
14. The Contractor argues that this is not LD but penalty (4 M US$ arbitrarily calculated). He argues this is a deviation from what is mentioned in the Appendix to Form of Tender, which is an unlawful and unilateral decision exhibiting the Employer's upper hand. Any provision of LD will be valid only if it is a genuine pre-estimate on the likely loss. A penalty is a sum quite disproportionate to the Employer's likely loss and is set at a punitive level. It is not a LD if the sum stipulated is unreasonable in relation to the maximum possible loss that could be suffered. Substantial completion is achieved and the Employer has beneficial use of the project. In other words, the Contractor has substantially completed at that point in time when the Employer can take advantage of the project open for traffic as intended.
15. The Contractor argues that the Engineer has been silent in response to the Contractor's claims. This shows negligence and irresponsibility. Whenever the 'claims' Clause provides that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine, the Engineer shall

consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances. The Contractor contends that it did not turn out.

16. If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, the Contractor shall give notice to the Engineer, describing the event or circumstance giving rise to the claim. The notice is given not later than 28 days after the Contractor became aware of the event or circumstance so that the Employer can not be discharged from all liability in connection with the claim as per Clause 20.
17. DAB does not act in a judicial capacity and does not essentially follow the rules of natural justice, and there is no objective standard of fairness that must be complied with. So, what the Contract says is that if either Party is dissatisfied with the DAB's decision (or it fails to give a decision within 84 days) then either may, within 28 days, notify the other of its dissatisfaction; otherwise, the decision becomes final and binding. Where a Party has been given a notice of dissatisfaction, both parties have 56 days thereafter to attempt amicable settlement. The Contractor finds no counter-claim against DAB decision by the Employer other than in Arbitration.
18. The Contractor argues that the success of any amicable settlement procedures depends on confidentiality and on mutual acceptance of the procedure. Therefore, neither Party should seek to impose the procedure on the other Party. After fruitlessly attempting amicable settlement, the Parties are allowed to duly commence Arbitration. Although the Contractor offered to reduce its claim by 20% the Employer wanted a reduction of 50% and offered to give up all its claims. Under circumstances, the matter has been further disputed by the Employer.
19. Further, if the Contractor had submitted a claim for an extension of time based on the recognition of the RE's

letters as a variation, and for the recovery of its additional costs, it deems to be a formal receipt of the Engineer as per Clause 3.2, and such recognition in accordance with the delegation shall have the same effect as though the act had been an act of the Engineer. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion, and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract. However, lack of response, either denial or acceptance, within a reasonable period of time induces the Contractor to invoke the next step in the dispute process. Having understood the criticality of the project, the Engineer would have taken quite early steps to resolve the subject issue and therefore, taking a 'u-turn' as suggested by the Employer is not possible at this stage.

20. Regarding time frame, either Party is entirely free to commence Arbitration at any time provided, of course, the conditions precedent to Arbitration has been satisfied. At the same time, Sub-Clause 20.6 provides that the obligations of the parties, the Engineer and the DAB "shall not be altered by reason of any Arbitration being conducted during the progress of the works". Accordingly, the parties remain with their obligations fully, regardless of whether Arbitration has been begun or not. The Contractor can not suspend work or the Employer can not withhold payment because of Arbitration. On the other hand, if a Party obtains an Arbitration award, it makes little sense in referring the same matter again to the Engineer or DAB.
21. The Contractor's step into Arbitration after 56 days fulfils the timeline imposed at the outset. Next, the Arbitration agreement will typically specify the Arbitral procedures and the Request for Arbitration marks the start of the Arbitration process. Once a request has been served, the respondent must file a response which answers the allegations and asserts any counterclaim. However, failing to respond to a Request for Arbitration will not prevent

> the Arbitration from going-forward and will not shield the respondent from a final award on the merits. However, the Arbitral Tribunal may consider the termination of proceedings only when the Employer withdraws the claim or when the parties themselves agree on the termination or when the Tribunal finds it unnecessary or impossible to proceed.

However, the Counterclaimant denies all the claims. His main argument is that the Contractor acted *mala-fide* in execution of work without affronting the timely completion of the project and its national significance.

1. The Employer argues that there is no limitation set by the tenderer to govern his tender price. The tender offered was unconditional. Hence, it is the tenderer's obligation to identify and cater for the risks involved in construction, including the flood levels.

2. The drawings have been issued under Clause 3.3 (for the purpose of remedying any defects and further clarification) and not under Clause 13 (constituting a variation to the works) in response to a request for clarification.

3. The Engineer argues that the Contractor 'experienced in road works' would have understood the gravity of the issue/s before they blindly start and continue with the design of the bridge without having precise levels of the road.

4. The Engineer responded within a reasonable time frame but the Contractor failed to convince the Employer of any solid cause of interruption to the progress.

5. The prices quoted in the tender shall be comprehensive enough to include for escalation in the prices of materials and

labour. Market induced vacillations are therefore a risk to the Contractor.

6. Even if it is a variation, the Contractor has no valid ground for seeking time extension on the increase of quantity. The Contractor should have adequate resources to pump in varied works as usually come across in any typical construction works.

7. The Employer argues that instead providing evidence in support of such claims so much in identifying the actual cost incurred, the Contractor must satisfy the Engineer that any additional cost claimed does arise as a result of the event relied upon. In other words, the Contractor is to establish that, but for the disruptive event, the cost to the Contractor would have been less than it actually turned out to be and that the difference arose as a result of the disruption.

8. Liquidated damages (LD) for the delay in completion are apparently the main claim with the Employer and wish to invoke Clause 8.7 to penalize the Contractor for late completion. The Employer argues that if the Contractor however intends to avoid LD by showing his entitlement for extension of time, he must prove that;

    a. his program at that time was realistic and he could have achieved targets
    b. he was achieving the planned rate of progress
    c. a delaying event occurred
    d. cause of the delay gives a time extension entitlement under the Contract
    e. delaying event affected the rate of progress of relevant activities, and
    f. the effect to such activities has affected the completion date

9. The Contractor fails to accurately measure any under absorption of head office overheads because the damages are too remote and speculative. Although, the Contractor's entitlement as to claim for additional overhead costs has been confirmed in case law, the burden of proof on such lost opportunity entirely lies with the Contractor. The Contractor failed to bring any valid justification.

10. The Contractor must show that the delay was unforeseeable, uncontrollable, critical and causally connected, so that the circumstances made the scheduled completion shifted, considering concurrency (where two or more delay events arise at different times, but the effects of them are felt (in whole or in part) at the same time) where both the Employer and the Contractor are causing delay. The Employer argues that even the Contractor gets an extension of time; he is only entitled to any loss and expense incurred as a specific consequence of the Employer-caused delay. The burden of proof lies with the Contractor and the Contractor failed in that regard also.

11. If the Contractor is able to identify extra costs at the activity or event level, he recovers these but not the general running costs of the project. The Contractor should nevertheless be entitled only for the actual loss and not the actual cost (in other words, the difference between the actual cost incurred in delay and the cost that would have incurred under normal circumstances as planned for which the Contract rates are inclusive of basic cost, overhead and profit). The sum so arrived will eventually cover up any escalated component in prices of materials and labor and any loss of productivity. The Contractor's claims under individual headings definitely over-compensate the loss to the Contractor if any.

12. Within 42 days after the Contractor became aware of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. The Employer contends that the Contractor failed to lodge his claim within the subject 42 days (period between 12 July 2002 and 30 June 2003 just before the completion exceeds 42 days) so that his right to lodge the claim is lost in absence of such proposal as per Clause 20.

13. The Employer contends that the DAB should have given its decision with reason. The DAB's decision was taken on the spur of the moment and ill founded so that it is not a valid matter to take a step forward in the dispute process.

14. The Arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Engineer, and any decision of the DAB, relevant to the dispute.

    However, if any dispute is referred to the DAB in accordance with Sub-Clause 20.4 of the Conditions of Contract, the DAB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DAB shall:

    (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
    (b) adopt procedures suitable to the dispute.

    Unfortunately, the DAB has acted alone without any opportunity for the Employer to present his case, so that

DAB's decision for time extension till 1 June 2003 is no longer valid. The inquisitorial procedure DAB adopted has actually caused a shear injustice to the Employer.

15. No dispute may ordinarily go to Arbitration unless it has run the gauntlet, as laid down in Clause 20. When a dispute is referred to the DAB under the Clause, it gives a decision on that dispute and, thereafter, if a Party is dissatisfied with that decision, it gives a notice of dissatisfaction as to that same dispute. Whatever other disputes there may be between parties, none may be arbitrated unless it has gone through the process. Accordingly, if the Arbitrators embark on any other matters, without the parties' consent, they will be exceeding their jurisdiction and, hence, their award shall be set aside. If the DAB to decide whether there had been a variation and also its claim for an extension of time which is itself based on the notional delay had there not been acceleration (but not any other of claims as the Contractor allegedly reasons that their quantification depends on the extension of time ultimately granted), only claims of variations and extension of time can be considered in the Arbitral Tribunal.

16. However, in this scenario where the Contractor claims that it has been wrongfully denied an extension of time by the Engineer, such a dispute might be considered to include the Employer's claim for liquidated damages for the same period. Therefore, the Employer should not have to submit such claim, as a dispute, to the DAB in order to be able to assert it as a counterclaim in the Arbitration.

Under circumstances, the issues to be determined by the Arbitral Tribunal shall be those arising from the documents and evidence already filed, and from further pleadings, evidence and submissions presented by the Parties in the course of this Arbitration, and shall include any question of law, fact or evidence that the Arbitral Tribunal may deem necessary to decide in order to determine such issues. The issues to be determined might include, but are not limited to, the following:

1. Whether notice requirements have been met by the parties in compliance with the time frame specified in the Contract.
2. Whether the parties lose their rights to claim if such notice requirements in time are not fulfilled.
3. Whether the Claimant had no sufficient time to identify the errors well in advance and, as an experienced Contractor, he was not able to reasonably foresee the flood levels at tender and whether he had any reason not to anticipate and whether it did fell beyond the bounds of common sense.
4. Whether giving precise road levels is the Engineer's sole responsibility.
5. Whether the Contractor demonstrated a clear cause and effect relationship between the Employer-caused delay and the actual loss.
6. Whether unprecedented price increases prevailed during the period in question.
7. Whether the additional works fell on the critical path shifting the scheduled completion.
8. Whether the claims are contractual, compensable and excusable.
9. Whether the method of computing the actual loss is logical.
10. Whether the punitive damages and liquidated damages are unlawful.

11. Amount of actual loss suffered in any.

14.20 Overview

Negotiation is the basis for any ADR mechanism. It is a process of working out an agreement by direct communication which is voluntary, non-binding, bilateral or multilateral. Each party may utilise any form of external expertise it considers necessary. Mediation is a private, informal process in which parties are assisted by one or more neutral third parties in their efforts towards settlement. A mediator does not decide the outcome; rather he facilitates the settlement process for the disputants to decide their own solution. During a facilitative mediation, the mediator is trying to reopen communication between the parties and explore the options for settlement. If, on the other hand, the mediator is called upon to state his or her opinion on any particular issue then he is clearly making an evaluation of that issue. Conciliation is generally reserved for the evaluative process and in practice mediation may take an evaluative orientation in order to reach a settlement. This may occur intentionally, at the request of the parties, or with forethought on the part of the mediator. The boundary is clear in theory, but not necessarily in practice.

Adjudication relies on an adjudicator having the power by virtue of his agreement to impose a decision. More specifically, adjudication may be defined as a process where a neutral third party gives a decision, which is binding on the parties in dispute unless or until revised in arbitration or litigation. Adjudicator's decisions are usually expressed as being binding until the end of the contract when either party may seek a review of the decision, most commonly by arbitration. Arbitration is a process, subject to statutory controls, whereby disputes are formally determined by a private tribunal of the parties' choosing. Providing arbitrators stay within the law, there is generally no appeal from the arbitrator's award and the award may be enforced by the courts if necessary. Since disputes are often of a technical nature, expert evidence is frequently encountered in construction litigation. Med-Arb is essentially a hybrid ADR two-stage process. In the first stage the parties attempt to settle their dispute amicably in the forum of mediation. If a settlement cannot be found, then the parties move to the second stage arbitration. The essential characteristic of this technique is that the mediator in the first stage becomes the arbitrator for the final and binding stage. The commitment by the parties to use this process may arise either through the contract in the form of a multi-stage dispute resolution clause or alternatively the parties may agree to bind themselves to Med-Arb once a dispute has arisen. DRB is a site based representational forum that gives non binding recommendations. DAB has been promoted in 1999 FIDIC version with procedural rules. In effect, part of the function of the engineer had been removed, thus giving the DAB a considerable power to deal with disputes arising during the course of the works.

14.21 Summary

A dispute does not arise until a claim had been made and the other party has either denied partially or in full, or expressly not admitted the claim. A reference to a dispute clause aiming a settlement of a dispute shall not in any way vitiate nor invalidate a Contract neither shall it be ground for the Contractor to cease works nor for the Employer to terminate the employment of the Contractor. Meanwhile the Contractor shall proceed with the works with all due diligence unless the Contract is expressly terminated or abandoned by the Employer in writing.

The obligations of the parties, the Engineer and the Engineer's representatives shall not be altered by reason of any dispute settlement effort being conducted whether during or after the progress of works. However, a party who intends to invoke the provisions related to dispute settlement shall give a written notice of such intent and express its disagreement if any within the time frame stipulated in the said provisions, failing in which no further proceedings shall take place and the latest decision shall remain final and binding. Without prejudice, nothing in an agreement shall prevent the parties from referring a dispute to any other alternative means of resolution by subsequent written agreement and such reference shall be subject to the terms and conditions that will be mutually agreed upon between the parties.

A recent trend is that the parties need not invoke the dispute clause because they feel a formal and confronting sense of a dispute with the Employer. Any settlement efforts taken place internally are most welcome. These efforts of 'internalizing' the dispute process have been popular at the moment, despite of whether they are called neutrals, referees or nominees. However, the recommendations are neither binding nor final. Even if their recommendation is contractually 'non-binding' it does not appear to impair the efficacy of the recommendation. Parties are free to either accept or reject the options, altogether showing many characteristics of mediation with an evaluative orientation, although the mechanism is not a fully fledged standard mediation in strict scientific sense.

CHAPTER 15
GETTING THE CONTRACT UNDERAILED

15.1 Introduction

As the concluding chapter, it is important to highlight the lessons learnt and the reflection of the preceding chapters for a dispute free project delivery. Starting with the key characteristics of international projects, and how they differ from the local contexts, the author identifies several landmarks that are imperative for a good contract practice in order to avoid disputing issues. Amongst them are the right choice of procurement method, proper contract documentation, comprehensive contract review, existence of an early warning mechanism, a working culture to foster value engineering, control in scope creep, timely notices and contemporary records, prevention, best effort and mitigation of potential risks, mediatory measures in the settlement of issues, claims and disputes, proper contract close-out, post project review, promoting reflective practice and sharpening core competencies.

15.2 International dimensions

National construction contracts are those entered into by parties belonging to same domicile in a country engaged in business of domestic construction. The relationship is linear and simple. International construction contracts involve multinational participants from different political, legal, economic and cultural backgrounds in a composite relationship. A contract is not national when there is an international component (which could be technical, financial, legal, or physical). International contracts have been the trend apparently because of globalisation in many sectors that has led to evolving a segment of law distinctly in construction.

An international construction project often involves joint ventures between companies from many countries and participants from diverse disciplines such as architecture, engineering, quantity surveying, and project management. This calls for cultural sensitivity in managing human resources as problems related to language, attitude, perceptions, approaches and strategies may arise. However cultural issues are not much found in national construction contracts, at least not to the same extent. This cultural diversity is often visible in international contracts and a high emphasis has been placed in dealing with the human factor in UN projects, for instance.

International construction contracts are likely to be more sizable in terms of value of work and of greater complexity in terms of type and technology used than in national construction contracts. Of course, there can be quite small projects also, e.g. a simple feasibility study. International construction contracts may be found in both private and public sector and include various types of facilities, power generation and distribution, telephone communications and data transmission networks, desalination, gas and oil, waste water, and major transportation infrastructure projects. This is again due to the inevitability of foreign inputs. A classic example is airport projects in which IATA regulations are the basic norms. The proposed rail line to connect the Gulf region is surely international as it crosses all boundaries. Most of the Tsunami projects in Sri Lanka spearheaded by oversees agencies are literally international.

More parties mean more risks, finance and interface. This in turn justifies the importance of bringing participants with necessary capability and expertise on a competitive basis. An individual promoter would indeed be reluctant to accept the risk of finance relatively alone a large project. Substantial project finance and special insurance covers are fundamental for international construction contracts, meaning the involvement of both lenders and insurers shall be integral in the formulation of international contracts. Unlike national contracts, the international contract agreements must therefore be comprehensive enough to address the aspect of risk apportionment. On account of the higher number of participants, there will be correspondingly a higher number of contract agreements involved. For instance, sixty nominated sub contract packages were under ten main contracts when constructing the 4th biggest mosque in the world. Such contracts would bind parties for example, the Employer and the project's funding agencies, the Employer and the Main Contractor, the Employer and the Consulting Engineer, the main Contractor and his sub-Contractors or suppliers, the Main Contractor and nominated sub Contractors, as well as the Employer and the Principle Architect and his specialist sub-consultants.

Novation agreements are also often made by parties in procurement of some special installation earlier than the main contract is placed in effect. A greater number of participants in international construction contracts results in more fragmentation of responsibilities, with sub Contractors and suppliers involved in the supply chain. With a view to minimising the incidence of disputes, such contracts shall have provisions to manage carefully the technical interface between several contracts across national boundaries. As such, there is a clear need for uniformity of practices and procedures for international construction contracts, (having understood the heterogeneity and uniqueness of each project) as these invariably involve parties having different requirements. This helps avoid idiosyncrasies of those who originate projects and potential disputes at a later time. This has led to the development of procurement policies, procedures and standard forms of contract, such as those developed by FIDIC, JCT, ICE or funding agencies like the European Union or the World Bank.

However, the risks associated with international construction contracts are generally more complex and greater. Among the most important are the "political risks" (risks associated with actions of the host government, its agencies and Courts, particularly in granting licences and permits, adopting taxation rules and the enforcement of contractual obligations) and "currency risks" (fluctuation, transferability and convertibility of the local currency) etc. In example, notwithstanding the various forms of surety that are available, such as government equity participation, subsidies, loans and bank guarantees, these do make exception for some construction risk.

A problem for Contractors and suppliers working in today's volatile material market is that estimating, bidding and financing major construction projects is a challenge and many face significant erosion of their anticipated profits. This is partly because the majority of Contractors have been locked into fixed-priced construction contracts where the risk of material price and supplier cost increases has been taken on-board. A surge in material costs will affect their bottom lines considerably where profit margins are not as high as they once were. These problems would have never come across in national contracts so substantially. Price escalation in international contracts has been a controversial subject amongst professionals which has been less talked about in national contracts. The recent oil price impact on international contracts is still a case pending reasonable compensation. But, in contrast, there are formula methods of computing unabsorbed price escalations in both national and international contracts.

In many respects the principles governing the construction contracts are equal in terms of how rights and obligations of the parties have been defined. Almost 70% of the contractual provisions governing the relationship of the parties provide no significant difference. However, in a purely domestic contract, the applicable law will normally be that of the country whilst in international transaction, the position is more comprehensive. There may be two or more different national systems of law capable of qualifying as the substantive law of the contract. In an international contract, the law construing a contract is basically the local law where the contract is signed. Also, it could be the law of the country where the project is undertaken. It could also be the law of the state where a significant part of the contract works are manufactured, or where the contract is financed or simply the law which the parties regard as well suited to govern the particular contractual relationship. For instance, disputes arising in international construction contracts are usually settled on the basis of international commercial arbitration practices as well as the associated international conventions, rules and laws, such as the New York Convention, the ICC Rules of Arbitration and the UNCITRAL Model Law. Disputes under national construction contracts on the other hand are likely to be settled through domestic arbitration or litigation means. In national construction contracts, disputes are settled and remedied in one jurisdiction under a single system of law. By contrast, international contracts are mostly governed by laws applicable universally or at least regionally. For instance, contracts in the Middle East are construed by Law of Sharia and other civil codified laws.

Local governments go for international contracts by the reason of funds, technology and expertise. Contracts eventually become inherited with the foreign features, although it is difficult to exactly demarcate a national contract from an international one. While national and international construction contracts may not be too dissimilar in the nature of the work, a main feature that distinguishes each other is the 'diversity of work' as mentioned above, amongst various parties operating under different 'contractual arrangements'. These include design and build, turnkey, engineering, procurement and construction (EPC), build, own, operate and transfer (BOOT) and partnering. However, the traditional measure and pay method is often the one that stands globally.

15.3 Procurement choice

Selection of an appropriate procurement system depends largely on the accurate identification of user requirements. There is no universally accepted criterion in making the most appropriate choice as it depends on a gamut of legal, technical and economic factors. Amongst the basics however are the speed and certainty in achieving completion, the ability to receive the lowest price in competition, how far the desired quality can be met, and more over the way the risks have been shared, transferred or taken over. Here, the speed refers to the need to complete a project more quickly than other projects of similar nature, complexity and size. Shorter construction duration can be achieved by accelerating measures or fast-track strategies which would favour the use of management contracting, for instance. Since the requirement for a speedier completion could often result in a premium in the price and quality, a valid justification is indispensable prior to stay in a decision. Certainty of completion time relates to the degree of certainty that a project will be completed on the exact date as specified in the contract. The formula is that the greater speed a procurement system can offer, the higher the degree of certainty the project can be completed on time.

How certain the lowest price a procurement approach could offer is the next dimension. Procurement approaches offering the highest price certainty include design and build and the traditional lump sum method. As far as the quality is concerned, it has several components namely quality of materials, workmanship and the design concept. When high levels of quality of materials and workmanship are required, a thorough scrutiny level has to be set in place. Design quality is generally influenced by the time availability, the expertise of the designer himself and more importantly the way the Employer's requirements have been articulated in a brief. At the tail, the Contractor's construction experience contributes a lot in design quality if the design and build or related variant is the procurement choice.

In nutshell, each procurement system has its own merits and risk profiles so that it is important for the Employer to know how and to what extent the risk has consciously been passed to the Contractor and down the line in the supply chain, how it has been shared, and how the risk may not have been passed on at all. It is often the case that the form of procurement route will be prescribed for the Contractor, similarly in large international projects where funding bodies may prescribe the choice of contract. However, the success of the project may largely depend on the right contractual 'vehicle' being chosen; otherwise it will take everyone to a wrong 'destination'.

15.4 Contract documentation

A construction contract is a result of a series of promises exchanged between the parties, verbally and in writing, over a considerable period of time, as opposed to a traditional one-time purchase contract.

Although an unwritten contract which can be either implied in fact or implied in law, may be legally binding, construction is an exception. Construction contracts are preferred to be in writing. Most jurisdictions have rules of law which may render oral contracts unenforceable, especially those involving large amounts of money.

A contract is unenforceable if it is fraudulent. The logic behind the written requirement is to prevent false allegations of the existence of contracts that were never made. Hence the contracts that do not meet the requirements of legal provisions are null and void. However, a party unjustly enriched by an unenforceable contract may be required to provide restitution for unjust enrichment.

Usually, there must be a memorandum to evidence a contract, which may come into existence just before the contract has been formed. All concerns agreed after tender queries and their responses and clarifications, post tender negotiations etc will be consolidated in a Memorandum of Understanding (MOU) reflecting the final *consensus* between the parties. This memorandum must be signed in some way, in place of a series of documents. It must contain all material terms of the contract, the subject matter and the parties to the contract. If a contract is in a written form, and somebody signs the contract, then the parties are bound by its terms regardless of whether they have read it or not provided the document is contractual in nature. Hence, a memorandum of understanding is where the convergence of will has been expressed and the intended common line of action has been indicated. In construction contracts, MOU has the binding power of a contract; as a matter of law, contracts do not need to be labelled as such to be legally binding. Whether or not a document constitutes a binding contract depends only on the presence or absence of well-defined legal elements in the text proper of the document (the "four corners"). For example, a binding contract must contain a mutual consideration - legally enforceable obligations of the parties and its formation must take place free of the vitiating elements such as fraud, duress, undue influence, underage and lack of mental capacity.

For any contract, essential elements include a description of the work to be done, the price and how it may be determined and how payments are to be made, and the time of completion. Further, a contract will include conditions that cover default by parties, how variations are to be considered and dispute resolution procedures. The client will determine the amount of risk they are prepared to accept and so will choose, and in fact must choose, the contracting arrangement that best suits the risk profile for the job. Risks are identified and apportioned, generally, to those parties that can best deal with. Particular conditions make changes that change the risk allocation and, when pricing, a Contractor may not sometimes fully understand the effect of that change in the work they are required to undertake. Contractors will either accept the risk or provide prices that cover the perceived risk. Conditions of contract therefore come in all shapes, from simple handshake agreements to verbal agreements which are subsequently confirmed in writing to short form contracts and long form forms.

A simple contract inevitably starts with all parties in what appears to be full agreement, however, when things go wrong, and then the conditions of that contract are frequently misinterpreted in one's favour. Contracts in writing supported by and exchange of correspondence will better define the work to be done, the standard of the work and how and what payments are to be made making the contract administration easier as the conditions are better understood.

15.5 Contract review

General Conditions of Contract shall apply across the board while giving due reference to Appendix to Tender where applicable. Afterwards, some of these conditions are superseded by the 'Conditions of Particular Application' to suitably assist and address project specific local requirements. These requirements depend upon the type of project, contract modality, pricing method or any other arrangement. They could be full and partial lump sum and re-measurable works or full and partial design and build with extension to operation, maintenance and transfer, for instance. There may be conditions of particular application on the type of project such as roads, dredging, marine or electro-mechanical works. Also, these conditions of contract include various standard or bespoken forms for the Contractor to use in a variety of circumstances guaranteeing indemnity at varying degrees. These may usually be the advance payment bond, performance bond, retention bond, direct bank transfer, novated form, vesting certificate, parent company guarantee, etc. With these in mind, the latest trend to integrate a series of options in one single model enhances versatility in contract governance.

Connectivity is the bondage of all those involved in the contractual machinery using many types of documents in effect. Of them, the function of conditions of contract is to spell out the rights and obligations of the parties to the contract, basically on the principles of risk allocation, good faith and fair dealing. Beyond the parties to the contract, these conditions stipulate duties, rights and obligations of the non parties to the contract also since it is indispensable to define the connectivity of these personalities (Engineer, Engineer's representative, nominated sub Contractors, suppliers etc). However, some customized documents resulting in one-sided language harm the even risk allocation amongst the parties, thus resulting in imbalanced apportionment of project risks. The outcome may be that the rule of contra preferentum would fall against the Employer.

As mentioned, contract conditions dictate the allocation of risks between the contracting parties. Even when standard forms of contracts are used, modifications are virtually made to various provisions. As construction contracting has become more complex, structuring contract agreements requires more extensive review of interrelated terms and conditions and balancing the possibilities of risk against overall obligations. Only with a complete contract can risk transfer, risk allocation, and risk shifting issues be evaluated, and indemnification issues, including any exculpatory language that are assessed accurately. The basic concern is to have the entire contract document available for a holistic review.

Whether a contract is of a standardized form, a proprietary form or bespoken, the elements that are usually given in form of specifications, drawings, bill of quantities, pricing preambles, etc provide a framework for review. Any final understanding just before they sign the contract is what essentially matters. Any other 'understanding' that took place in between the tender and the contract might have flown away on some reason, for instance, the drawings issued from time to time for tender clarification would be no longer valid in a technical sense but it is the contract drawings that form an integral part of the contract. Getting the contract right in this way is not a photocopying in bunches as many have accustomed to, but is a professional piece of work articulating what parties have truly bargained for. A contract with ambiguities, inconsistencies, errors and omissions, obscurities and anomalies are a potential source of disputes and a permanent drain on client's budget. The whole idea of review is to detect them, rectify where possible, and un-derail wherever gone out of line.

However, a situation that has been in the majority of international construction contracts is the pursuit of principle features of the FIDIC and other internationally acclaimed standard forms even in locally customised contracts. Conversely, there are many subtle changes that eventually imbalance the even risk allocation between the parties. Many contracts drafted in one sided language biased towards the Employer are a result of cut and paste exercise. The message to Contractors entering into contracts on the basis of these forms is to review them carefully without being fooled into thinking that they are simply the FIDIC versions.

Contract interpretation has become a day today phenomenon in any typical construction project where interpretative doubts arise because of errors and omissions inherent in these documents, *inter-alia* due to short planning and documentation stage, lack of expertise and supervision lapses in pre contract services. A thumb rule in clarifying an ambiguity is that a contract must be read as a whole. No one should construe words in a vacuum but consider all background knowledge (which is often referred to as giving due regard to the circumstances involved) which would reasonably have been available to the parties in the situation in which they were at the time of the contract. A contract must receive such an interpretation as will make it lawful, operative, definite, reasonable, and capable of being carried into effect, if it can be done without violating the intention of the parties. "It can neither be uncompromisingly literal nor unswervingly purposive; the instrument must speak for itself, but it must do so in-situ and not to be transported to the laboratory for microscopic analysis" according to Sir Thomas Bingham. Basically, the parties must take the plain, literal, and ordinary meaning of terms and conditions when construing a contract.

15.6 Early warning mechanism

Some standard forms place an obligation on both the Contractor and the Engineer, or his representatives on behalf of the Employer, to give an early warning by notifying the other as soon as either becomes aware of any matter which could increase the contract price, delay the scheduled completion or impair the performance of the works. Also these forms sometimes state that if the Engineer notifies the Contractor of his decision that the Contractor did not give an early warning of a likely compensating event which an experienced Contractor could have given, the event is assessed as if the Contractor had given early warning. The obligation is reciprocal, therefore. Conditions of contract limit the assessment of any compensating event to the assessment that would have been made, had the early warning been given. In other words, the Contractor cannot make additional recovery. In the meantime, there is no express sanction on the Engineer for failure to give an early warning. However, such a failure might be seen as a breach of the requirement to act in the spirit of mutual trust and co-operation. In theory, that would entitle the Contractor to damages. However, in practical terms, there would be a potential breach of contract by the Employer, which is in itself a compensating event.

Establishment of a core group in some projects is practical than enforcing. If stated to be applicable in the Appendix to Tender, the Contractor and the Employer shall establish a core group for the project including the Quantity Surveyor, Architect and the Engineer's Representative who shall meet regularly to review and stimulate the physical progress of the Works and discuss and agree onto the issues arising at site level. A meeting of the core group members shall be convened by the Engineer and the decisions of the core group shall be by unanimous agreement of all core group members present at the meeting and any decision of the core group shall be confirmed by an instruction of the Engineer. The Employer and the Contractor shall comply with any decision of the core group made within the scope of its agreed functions. The Employer and the Contractor operating in an early warning system shall notify the other and the Engineer as soon as it is aware of any matter adversely affecting or threatening the works and shall include in such early warning notices for avoiding, mitigating or remedying such matter. The Engineer shall convene a meeting of the core group to agree an appropriate course of action unless all core group members agree such course of action without a meeting.

As a result of prior knowledge gained by regular site visits, this group is able to deal with the issues quickly as they arise. Generally core groups are acting within the time restraints however, in most cases this is more than offset by the advantage of a decision being provided speedily. Another concern is that the core group prevents any disputes build-up by continuous follow-up and intervention as soon as disagreements occur. The group can, with the agreement of the parties, be asked to give an advisory opinion similar in nature to a judgment on a preliminary point in arbitration. The advisory opinion can be used when the parties need guidance on technical matters that is preventing a further dispute. Because of the familiarity with the project, facts are better understood by everyone, perhaps a must when administering a dispute, more or less in capacity of a dispute review board. This is important when in most projects; the same staff rarely remains till completion that deprive the arbitrator the benefit of their first-hand know-how of events. With such individuals on hand, greater certainty prevails and the materials relevant to the issue can be easily dug out. Unanimous decisions engender confidence in the dispute process and are more likely to result in a settlement. Working relationships are less injured and site-level partnering can continue.

15.7 Value engineering

As it indicates, value engineering is a scientific approach to enhance the value of products, services or operations through engineering measures taken systematically. Value, as defined, is the ratio of function to cost and value can therefore be increased by either improving the function or reducing the cost. A primary tenet of value engineering is that there can in no way be a compromise in quality, workmanship and performance in the pursuit of value enhancement.

Contractually, the Contractor can be allowed to bring his own proposals, resulting in cost and time savings without technical sacrifice, or otherwise be of benefit to the project, by and large. This is permissible under variation clause or in a separate clause dedicated for value engineering. Although, as a principle, no variation to the contract can be made by the Contractor, it does not however restrict the Contractor to submit value engineering proposals which in the Contractor's opinion will if adopted accelerate completion, reduce cost to the Employer in executing, maintaining and operating works, improve efficiency, and enhance value of the completed work.

A value engineering proposal may therefore include alternative methods of construction and maintenance or substitutes to materials, equipment, or even in designs and construction processes that save time and money in long-term maintenance. More importantly, as already stated, value engineering overcomes paradigm blindness - the way we do is the best because this is the way we've always done. It opens all in line to new methods, ideas and tools to improve their effectiveness. Since the mindset to invoke variations is often defensive as it is compromisingly related to time and cost, value engineering in contrast, can best be promoted as a constructive procurement choice for a prudent contract practice.

With value engineering in mind, the Engineer issued a site instruction to raise the foundation level thereby reducing the amount of excavation in order to minimize the quantum of de-watering by percolating waters surrounding the surface of excavation. Having complied with the Engineer's instruction, the Contractor claimed for additional cost on foundation. Dewatering in this particular contract is a lump sum item and the Engineer argued on the basis that the intent of the site instruction was to reduce the effort on dewatering that should eventually reduce the cost.

The Contractor contended a scope creep without corresponding provision for the requisite resource inputs, or rather; they were not informed about the changes. In other words; there were revisions made to the tender drawings with consequential increases in the scope of work that became apparent to the Contractor, hence the Contractor expressed his desire to recoup the cost involved. It was found that dewatering being a lump sum item not measurable for the purpose of payment in this particular contract. Whether it is 1 litre or Million litres, the Contractor has taken on board the risk of inadequacy of the lump sum quoted. If the Engineer had intent of value engineering by raising damp proof course level with the aim to reduce dewatering, he should have clearly stated that in his instruction. It has been noted the changes in the scope as observed and brought forward by the Contractor is the basis of what has led to this point. If the Contractor subsequently contests that the Engineer's intent of bringing a saving to the contract cannot be achieved, fully or partially, the whole argument of the Engineer may not be without counter-argument.

Also, it would have been a matter of design of a dewatering system ranging from simple pumps to deep extraction and recharge well systems. The Engineer would have evaluated alternatives to minimize dewatering costs. A number of projects have included excavation and backfill under water to minimize dewatering costs and some dewatering designs have been integrated with excavation support or barrier wall systems. These evaluations include base stability of the excavation, angle of repose once backfilled, as well as phonemic impacts of dewatering on the structure itself.

The Contractor had a case for additional costs on raising the foundation level definitely and may well be having a case on dewatering provided the said instruction to raise level caused more dewatering as a consequence. This is purely a technical judgment in comparison with the methods of dewatering the Contractor envisaged in the tender and what was actually carried out at site. The Contractor had allowed for this uncertainty in his price for de-watering and there is no approved method statement in place to depend upon if it is to measure the scope of de-watering envisaged during tender stage. Therefore, it is deemed, increases or otherwise in de-watering scope is part of the risk and he has indeed provided for all dewatering works involved with this project. If the Contractor's new pumps in more capacity were needed because of the fault of his technical approach, then the cost difference is on the Contractor's account and payment made only for bills of quantities (B/Q) allowance. The notes on pricing document makes it a Contractor's responsibility pertaining to the risk involved with excavation as stated that 'the Contractor shall take and accept responsibility for the character of the ground and no extra price will be allowed for excavating in surface concrete, reinforced surface concrete, paving flags, tar macadam, loose rocks, debris, rubble, boulders, loose stones, old foundations, running sand, mud running water, water table etc'. Regarding time impact, it can not be exactly the same period of delay in more dewatering or more time devoted on foundations, as the Contractor says. It is the net resultant impact on scheduled completion.

Work subject to Engineer's approval in lump sum contract situation is a one that seeks to satisfy functional and quality requirement contrary to the Employer's expectations in terms of cost without genuine and agreed value engineering exercise. In general, the Contractor is free to choose any method of construction within the limit of fair engineering practice that meets the specifications of the contract provided the contract does not call for a specific method or approach. If the contract specifies the method and the Contractor wishes to go for another method with a lower cost then it is a deviation which needs approval from the Owner prior to procurement and/or execution. Obviously the Contractor needs to convince the Owner if the method proposed meets the contract requirement. Usually the cost saved is shared between the Contractor and the Owner on a mutually agreed percentage. It is on record that the Engineer did not issue any certificate for non-conformity, hence no case of contractual deviation can be established, which is not even an issue, in this matter. The estimated 10% for actual dewatering cost which is proposed to cover cost of pumps, hoses, reservoir and attendant labour is without details but mere assumptions which could be compared to ex-gratia discount request. This approach is without serious cost details. That the anticipated volume and approach for dewatering has not been undertaken is perhaps an issue which none of the contract documents can establish its exactness.

This matter should not be pushed to limit as the Client stands to gain nothing from this approach. Given that the Contractor has belatedly considered some savings to the Client, this opportunity should be capitalized on to ask for more discount as means of commercial settlement. Contractor's discount offer is for all dewatering cost. Without prejudice to ascertained quantities by the Consultant, the Engineer then proposed 30% discount on the total cost of dewatering to be negotiated and agreed with the Contractor. This is *Quid Pro Quo* for a contract to be binding in exchange of something of value.

A lesson to learn is that key to successful project management lies with the ability to effectively optimize the key elements of quality, cost and time within the contractual framework of the project, throughout the acquisition/construction period. Therefore, cost management or cost control responsibilities go beyond mere or arbitrary deductions of costs of what is termed as unimplemented items of the project or changes to work execution methodology. Value engineering is the best if adopted in the right sense.

15.8 Scope creep control

A work scope is liable to change most of the times. What is important is to keep the variability of the scope to the minimal through procedural measures. However, the task of keeping this momentum throughout the currency of the project becomes complicated in case of a scope creep. Scope creep is simply when changes are allowed to the original project scope that are not controlled in any shape or form. It is also adding features and functionality (project scope) without addressing the effects on time, costs, and resources. This is known to be a silent killer that takes the parties unconsciously unaware of long term repercussions. The lack of definition of the scope of work basically results in gradual and incremental change over the original scope of work, along a considerable period of time so that only through procedural means a contract can be monitored for any slippages in time and cost parameters. In absence of a comprehensive change management mechanism, a contractor may well be having a claim for a series of disruptive events that eventually results in a global claim for which the effects can not be isolated or segregated according to the individual causes. As a result, contractors claim that the resources have been stuck on a project that is never completing so that they lost many other future opportunities in the industry.

15.9 Notices and records

Notices convey ones intent and must be in good faith. For a successful claim, clear factual evidence is a crucial element. Records are the assets to justify or defend allegations a disgruntled party would refer to. They become contemporary once they are collated at site level or at any other source in the first instance and authenticated by the Engineer with the idea of ensuring virginity of the contents for a legitimate claim. In any standard form, the Contractor has been given a liability to keep contemporary records as may be necessary to substantiate any claim and further it notifies that those records must be maintained either on site or at another location acceptable to the Engineer. The Engineer may after receiving such notice, monitor record keeping and instruct the Contractor to keep further contemporary records, as the case may be. If instructed by the Engineer, the Contractor shall submit copies to the Engineer.

Where delays occur, Contracts usually provide for a notification regime. Conditions of contract mandate that the Contractor is required to give notice of circumstances which might lead to a delay of any kind, immediately the Contractor becomes aware of such circumstances. This provision usually applies not only to circumstances out of which the Contractor might ultimately claim an extension of time, but all circumstances where the Contractor is likely to be delayed in achieving practical completion (even where, for example, the delay was caused through the Contractor's own fault and the Contractor is not entitled to such an extension of time). Where the Contractor fails to give the necessary notice he will be barred under the Contract from bringing a claim for an extension of time and/or delay costs. Notice requirements must therefore be a basic obligation under the contract. They can also be implied as customary to industry good practice and as a result, parties warrant to have informed of any eventuality at the earliest practicable opportunity. A substantial body of law has also recognized the effect of time bar clauses as an obligation.

A typical case involves accumulated impact of a series of changes, each of which may appear minor, but collectively have a disrupting effect out of all proportion to the work involved. Other changes may give rise to a re-scheduling of work, with consequent loss of productivity. Often, these impacts are difficult to determine until some time later. The phrase 'as soon as practicable' connotes doing something with all reasonable dispatch having regard to all the circumstances. Notwithstanding the type of claim, notice of claims is therefore fundamental in any claim, a failure of which may amount to disregard the claim in its entirety. A question arises whether the Contractor's failure to timely notify his intent to claim will lose his right to lodge his claim in *toto*. The answer is yes when it is condition precedent. In this way, under most contracts, the Contractor is able to preserve his rights to claim until such time as the necessary information can be collated. Equally, the notices are applicable for the Employer. A notice shall be given as soon as practicable after the Employer became aware of the circumstances giving rise to claims on reciprocal basis.

15.10 Prevention, best effort and mitigation

Usually, a term implied to the effect is that the Employer will not hinder or prevent the Contractor from carrying out the work in accordance with the terms of the contract. Where an act of prevention such as a delay in approving a remedial scheme causes delay it is essential that the contract includes a provision for extension of time. In absence of a provision the completion date falls away and the Contractor is obliged to finish within a reasonable time. As a result of the completion date no longer applying the Employer is unable to apply liquidated damages even though the Contractor may be responsible for some element of the delay to completion. One consequence of the prevention principle is that the Employer cannot hold the Contractor to a specified completion date if the Employer has by act or omission prevented the Contractor from completing by that date. Instead time becomes at large and the obligation to complete by this specified date is replaced by an implied obligation to complete within a reasonable time. Simply, the prevention principle is based upon the established rule in common law jurisdiction that no person can take advantage of the non-fulfilment of a condition, the performance of which has been hindered by himself.

Cases are there in series that consider the right of a Contractor to have the contract period extended. On this basis the Contractor has been held to be entitled to an extension of time where delay has been caused by matters within the Employer's responsibility even where concurrent delay has also been caused by the Contractor's own default. In these cases both causes are either jointly or independently sufficient and each concurrent delay could be regarded as the legal cause of the overrun because the delay for which the relevant party is responsible is an event which the duty imposed upon them was intended to prevent.

On the same token, there is a duty on the party incurring additional cost as a result of a breach of contract to mitigate that cost. For instance, the Contractor must use his best endeavours to reduce the delay and in so mitigating, the obligation does not require the Contractor to expend substantial sums to reduce the delay. Hence, the best endeavours obligation only required a party to do what was commercially practicable and what it could reasonably do in the given circumstances (which will include applying resources in a manner so as to reduce the consequences of a qualifying delay, so that work is carried out efficiently).

In law, a party establishing a breach of contract shall be under a duty to take all reasonable measures to mitigate the loss which has occurred provided that he can do so without unreasonable cost or inconvenience. Accordingly, an injured party cannot recover damages for a loss which could have been avoided by reasonable steps. The injured party is not required to do anything other than in the ordinary course of business. Also, if the injured party takes steps which he could not reasonably have been required to do, and avoids the potential loss he cannot recover the potential loss as damages. Finally, the injured party may recover his loss or expense in taking reasonable steps to mitigate the loss due to breach of contract. The SCL protocol also considers that the Contractor's duty to mitigate its loss in two limbs; the Contractor must take reasonable steps to minimise its loss and the Contractor must not take unreasonable steps that increase its loss. For instance, a Contractor's decision to add a one more shift with the same tradesmen may deem reasonable on the ground of familiarity with the job conditions which in turn avoid leaning time unlike a new staff.

Under circumstances, the Contractor is usually required in construction contracts to do all it can to avoid, overcome or reduce delay. As mentioned, this duty does not extend to carrying out any change in scope any more efficiently than the original scope; spend more money in order to negate the effects for example adding extra resources by working outside its planned working hours or otherwise.

Since mitigation involves an aspect of management of resources and planning of activities in the circumstances of actual events, such an obligation may however require the Contractor to take some positive action, and a failure to do so may sound in damages measured by the liquidated damages for additional period of over-run which could have been avoided but for the breach. Since the obligation to proceed 'regularly and diligently' means to proceed continuously, industriously and efficiently with appropriate physical resources so as to progress the works steadily towards completion, it is suggested this will also include managing the effects of the delaying events.

The onus of proving the failure to mitigate rests on the party alleging the failure. A party cannot recover damages resulting from other party's breach of contract, if the damage would have been avoided by taking reasonable measures and if the mitigating measures were greater than what might be considered as reasonable. Further if the claimant incurs loss of expense by taking reasonable steps to mitigate the effects of breach, it is entitled to recover its consequential losses arising out of the mitigation. However, mitigation is not meant to be the minimum cost to be incurred as a result of breach. Neither has it meant to do everything possible to mitigate.

15.11 Mediatory efforts

A usual prescription in traditional contract forms, particularly in civil codified jurisdictions, is that any dispute shall in the first instance be referred to and settled by the Engineer. Traditionally, a period of 90 days is allowed for this decision, which shall be final and binding upon the Employer and Contractor until completion of the works. It is not a matter for the Contractor to stop work even in disagreement with the decision or whether the disgruntled party's intent is to invoke the next step in the dispute gauntlet. Only if the Engineer fails to comply with the above 90 days allowance or if the Employer or Contractor has a reason to dispute the Engineer's decision, either party may refer the dispute to a Competent Court of Justice, subject to a notice of intent once again. Parties have no choice other than the path to Courts in some civil codified jurisdictions where the customized bespoken forms upon very old standard conditions have been widely adopted in the administration of construction contracts. These Courts eventually rely on Court-appointed experts in the context of highly technical or commercial issues.

Considering the time factor, cost elements and more over the controversial nature of the issues in dispute, parties sometimes refer their disputes to what is aptly called Claims Compensation Committees as a shortcut for justice. The jurisdiction retained with these committees to adjudicate construction disputes is not clear to many practitioners, however. Another tendency is to look for alternatives, one of which is amicable settlement that gives extra opportunity for the disputants to revisit their issues with an in-house expertise. Quite often this mechanism helps the disputants to arrive at a consensus within the confines of the Employer's premises, being a resultant concern about the interrupted progress, the dual role of the Engineer (Employer's agent and independent certifier) and the propensity to obtain interim awards and temporarily-binding decisions.

Eventually believing in a process in which they are able to retain some kind of control over the outcome of their dispute, rather than a Court order, the Employers at times refer their matters to a third neutral or a panel of neutrals. Not to be pessimistic all the time, these neutrals will first evaluate the case independently and thereon a recommendation that best fits the party's requirements. Either facilitative or evaluative their role is, they do not operate in a vacuum but with technical, legal, financial and other departments hand in hand. There is no prior agreement for these neutrals to intervene, but eventually come up with options rather than decisions, to which the parties may either accept or reject. Such an arrangement in fact avoids somewhat rigid formalities in arbitration or litigation. Indeed, they closely resemble expert inputs and give advisory opinions when parties seek guidance on technical matters that is preventing a further dispute. Therefore, these neutrals function as a dispute preventing device permanently installed for the duration of the contract – in a way similar to a dispute review board, but not exactly the same.

Accordingly, when a dispute does arise, it is given early attention and addressed contemporaneously which avoids the commonly encountered situation of the Engineer being too busy to address a voluminous claim. Because of the familiarity with the project, facts are better understood by them in administering the dispute. This is important when in many projects; the same staffs rarely remains till completion which often deprive any arbitrator the access to first-hand know-how of events. With such individuals a greater certainty prevails and the materials relevant to the issue can be dug out much easier than ever since. Parties who act in good faith are likely to comply with a recommendation just as they would accept a decision anyway.

This 'neutral' approach is therefore versatile from forming strategic direction to the creation of an atmosphere conducive for 'talks for talks'. These neutrals interpret commercial and contractual issues in line with the contract documents, principles of quantity surveying and accepted norms, customs and traditions of the construction industry and form opinion as to contractual eligibility, validity and quantum of claims in terms of cost, time and otherwise. They critically appraise the public interests involved within the issues if any under investigation, conduct sensitivity analysis of each approach to ultimate outcome using logic and reasoning. Although this is not truly a scientific mediation, these mediatory efforts have been hided in the dispute settlement process in between the Engineer and the Courts. With no contractual machinery in support, however, it has now become a fact of life in public projects where the disputants are unwilling to call their Employer a disputant.

15.12 Contract close-out

Contract close-out is an administrative formality to verify that both parties to the contract have fulfilled their contractual obligations and nothing has been left remaining. In addition, contract close-out is the time to assess the success of a contract and determine if there are any lessons learned for future contracting.

A contract is completed when all goods or services have been received and accepted, all reports have been delivered and accepted, all administrative actions have been accomplished and final payment has been made to the Contractor. To initiate the close-out process, the Engineer should first determine that the Contractor has satisfactorily performed all required contractual obligations. A contract is ready for close out when all deliverables, including final installation packages and as-built information have been delivered and accepted by the Employer.

Accordingly, the Engineer shall receive from the Contractor the following items (not exhaustive) and materials which shall be collectively referred to as the close-out documents;

a. Application for payment
b. Request of retention release
c. Punch list showing all items certified as being completed
d. Properly executed consent of surety for final payment
e. Final release of liens for the total amount of contract sum
f. As built drawings
g. Warranty and maintenance information
h. Extra stock materials and special tools
i. Final accounting of all varied work
j. Certificate that all tests have been passed
k. Evidence that maintenance has been successfully completed

At this juncture, the Engineer must advise any outstanding items which may prevent the Employer from recommending that the project be closed out and final payment made to the Contractor.

15.13 Post project review

A post project review (PPR), sometimes called by lessons learned, project completion review or project post-mortem, helps determine whether the project delivered the desired benefits, met the customer's requirements and remained within the originally envisaged scope and budget, and if not the variance. It also helps gauge the user's comments about performance, reliability, suitability and ease of use. It is important to have a practice of post project review so that the same mistake may not be repeated in the next project.

PPR as a process consists of several activities performed by a project team at the end of the project's life cycle to gather information on what worked well and what did not, so that future projects can benefit from that learning. A project that runs longer than a year may usually conduct PPRs at the each of significant phase, so that the lessons are captured while they are still easily recalled. This process might also be used with a project that completed some time ago, but for which the lessons were not gathered. Though a technical audit is some kind of a project review, the intentions are poles apart. Hence, PPR is an opportunity to systematically improve performance in subsequent projects. Post project reviews -if they take place- are typically constrained by lack of time, interest and ability. The focus is mostly on technical output and bureaucratic measurements and not necessarily the process related factors.

The essence is that many organizations have no structured approach to learning from projects after their completion. Even worse, most projects have been prematurely terminated that never undergoing retrospective analysis on their causes of failure. A recent survey indicated that many projects are not reviewed at all after completion, and most of the remaining is reviewed without established review guidelines.

However, PPRs are more prevalent in industries where 'knowledge' is the main output of a project. For instance, consultants regularly perform after action-reviews in order to capture lessons learned from their engagements (continuing professional development sessions for instance). Post project reviews are sometimes fallen into complete neglect because they take time, discontinuity - beneficiaries of project reviews are future projects, not the current ones, and reviews involve looking back over events that project participants are likely to feel cynical.

People resent the fact that reviews frequently have become major finger pointing exercises, simply concerned with allocating blame for shortcomings in the project. Looking forward to new work is more appealing. The majority of defects are the fault of the systems that people work in rather than the individuals. Maintaining social relationships typically matters more to most people than accurate diagnosis of isolated events. People can be reluctant to engage in activities that might lead to blame, criticism or allegation. Many people think that experience is a necessary and sufficient teacher in its own right without closely reviewing what has been exactly experienced. Lack of expertise in the subject matter (incompetence to carry out reviews), lack of baseline data (benchmarks at the project inception in relation to objectives) to establish criteria of assessment in a post project review and poor maintenance of data during project progress are all discouraging.

Also, the political patronage to cover up inefficiencies and corruption (unwillingness to disclose the facts), lack of interim reviews making the final post review impossible depending on the issues that characterized the project. More over the fast track procurement basis of many construction projects cause rapid shift of project gangs from one project to another whose concern is time rather than review.

The knowledge of what occurred is usually dispersed amongst several people. The total outcome of project performance may not be known to everyone. Further, the knowledge needed to diagnose is similarly dispersed amongst several people. For instance people commonly make wrong assumptions about why others fail in their duties, and these misconceptions need to be corrected if reasonable remedies are to be identified for such failings. Learning from experience is therefore a collective effort.

Further, repeated errors are a characteristic of organizational life, particularly in dissemination of tasks. A mechanism of dissemination of task amongst the most suitable and capable people to do is important for speedy recovery of errors as well as learning through experience.

In nutshell, post project reviews have been fallen into disuse mainly because of the restricted time factor and the low level of understanding on their importance. Most of the projects currently being executed are of fast track nature so that time is critical. What has been forgotten is the time saving methods that can be derived via effective post project reviews? This lack of understanding is considered as a major drawback that discourages post project reviews. The next issue is the beneficiary. Those who are getting benefited out of post project reviews are the future projects and not the project in hand.

15.14 Reflective practice

Many professional bodies today, including those who are committed to protect the interests of surveying profession, expect that their members engage in reflective practice. Indeed, the 'real' reflective practice is a result of an iterative and interactive process. This helps reduce individual idiosyncrasy of stereo type surveyors, who simply repeat old practices for example. The depth of the reflection, thinking out of box, however, depends on one's experience in the subject matter backed by the theoretical know-how and then the intuition, thumb rules, guesswork, trial and error, etc what is collectively called as 'exposure'.

The importance of reflecting what is being done has been emphasized by many scholars. Amongst them was Donald Shon who suggested that the capacity to reflect in action so as to engage in a process of continuous learning is one of defining characteristics of professional practice. The reflection in action should take place in the action-present, which is the period of time in which action can still make a difference to an outcome. Shon argued that the model of professional training which he termed 'Technical Rationality'—perhaps more aptly termed a 'battery' model—has never been a good proposition of how professionals 'think in action'. Shon further stressed that this 'rationality' is no longer valid in the modern dynamic circumstances, where the 'change' is fundamental. His advice is to create a 'virtual' world in order to test the hypothesis and experiment the alternatives whenever the time is very limited, particularly in fast track procurement.

Basically the practitioners cannot get to problem solving without first engaging in what is clearly a non-technical process; the task of demarcating the four corners of the issue, naming the problem and framing the context. This means that the surrounding is susceptible to change and the only way to deal with is to learn and understand, and guide and influence these transformations. Thus, the practitioner allows himself to experience surprise or confusion in a situation which he finds uncertain and then he reflects on the phenomenon before him.

Although reflective practice is not yet well known in the construction industry, construction professionals sometimes unconsciously engage themselves in reflective practice to some extent. Generally these professionals declare that what they are offering their clients is the technical expertise. Many clients too expect only this technicality may be because they are unaware of benefits of reflective practice or they feel it a threat to their conservative systems. Shon[115] defined reflective practice as a process where a professional engages himself in a continuous dialogue with a situation and listens to its backtalk when dealing with uncertain or varying scenarios, in order to find appropriate solutions by modifying or reframing problems. Hence, the issue of reflective practice has a significant time value as well as a subject value as far as any construction related profession is concerned.

Reflective practice promotes autonomous learning that aims the development of one's critical thinking skills. Techniques such as self and peer assessment, problem-based learning, personal development planning, continuing professional development sessions, seminars and workshops, lifelong learning, and group work sharing experience can all be used to support a reflective approach. Reflection-in-action involves surprise, as mentioned earlier, a response to surprise by thought turning back on itself, thinking what we're doing as we're doing it, restating the problem in a new way, conducting an action experiment to test new thinking about a solution to the new problem, and to try to change the situation for better that ever since.

Accordingly, practitioners build up a collection of images, ideas, examples and actions that they can draw upon, which is central to 'reflective thought'. When a practitioner makes sense of a situation he perceives to be unique, he sees it as something already present in his repertoire. It is, rather, to see the unfamiliar, unique situation as both similar to and different from the familiar one, without at first being able to say similar or different with respect to what. In this way, the practitioner engages with situations without having a full understanding of things before we act, but, hopefully, major problems can be avoided while 'testing the waters'. When looking at a situation we are influenced by, and use, what has gone before, what might come, our repertoire, and the frame of reference.

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[115] "The reflective Practitioner – How Professionals Think in Action", Shon

Construction projects are heterogeneous and problems tend to present themselves as 'messy, indeterminate situations' and the practitioners' previous experience is of prime importance in using them in similar situations in future. From research in other disciplines (nursing, medicine, education) it has emerged that practitioners react to situations but few are indeed proactive. This may be because of the untested application, as usual in any kind of innovative attempt. Innovation activities are characterized by high level of risk, uncertainty and instability. The first phase of innovation is basically knowledge-building requiring fewer resources and taking long time to complete. There are innumerable obstacles to innovation in the current corporate environment. Among these are the risk that resources will be wasted on innovations that are not relevant to the company's central purpose, and the risk of lost opportunity. Some kind of confidence is absolutely essential prior to foster reflective practice under circumstances.

However, competition makes reflective practice imperative. Even successful innovations cause incredible booms and busts. People under- or over-estimate the potential profits of innovations. Electricity, the railroad, the telephone, the fax machine, and the Internet are all examples of the chaos that new innovations can cause for people who work with or invest in them. In order to capitalize on the innovative capacities, it should have some basic elements to foster it. The way it is provided can be formal or informal, but they must be present in some form to leverage reflective practice. Also, for innovations to be truly exploited, they need to be shared. Great developments by lone inventors, such as Thomas Edison, are largely of the past- most truly great inventions of today are the result of collaborations. Ideas are usually just starting points so that they need to be refined, augmented, and merged with other ideas. The first step in creating a culture of reflection is unleashing the creative potential of the professionals. Creativity is the competency to develop new ideas, concepts, and solutions to problems and the challenge is getting them to see the world with fresh eyes in order to develop fresh solutions.

Structurally, the contracts between Employers and Contractors should be gradually modified to make provisions for reflective practice. Professional bodies should per se add to the code of conduct to engage in reflective practice as it can not be practiced in isolation. The consultants need to continuously converse with the Contractors in framing problems, and in subsequently reframing them, as the dialogue and the back talk continue. For example, in the construction of a major highway in Oman across mountain, the cost consultant was struggling with the cost control due to far excessive materials declared unsuitable for embankment that became a permanent drain on the client's budget. The Contractor was in a dilemma how fast track the completion could be achieved, apart from this windfall. The cost consultant in the question revisited the specification and came out with a value engineering proposal of rock fill (a mix of crushed boulders and class 1 soil compacted at close intervals). The question of slow progress was framed to ask how rapidly this in-situ mechanical process could be executed to expedite the progress. When the specification was revisited for performance criteria as to compaction, an uncertainty arose as to whether compaction can be achieved at the crest of the embankment, which is something technical. This required the original question to be further reframed to ask whether a structurally sound embankment could be built with dry rock fill dam. Further investigations revealed that it is technically viable and as such the Engineer relaxed the specification yet enough to meet the basic performance criteria as stipulated in the standard specifications, making a huge saving on the contract. Such an approach would open eyes in all frontiers in bringing issues to viable conclusions. What matters is the competency to appreciate complex issues, to initiate workable concepts through the application of imaginative ideas, to listen objectively, and to consider opposing views.

15.15 Core competency

A core competency can take various forms, including technical know-how, a reliable process, and close relationships (Mascarenhas et al. 1998). If a core competency yields a long term advantage to a company, it is said to be a sustainable competitive advantage. The ability to consolidate corporate wide technologies and production skills into competencies enables firms to adapt quickly to changing opportunities, fostering reflection. Prahalad and Gary Hamel writing in 1990 Harvard Business Review article said that a core competency is 'an area of specialized expertise that is the result of harmonizing complex streams of technology and work activity.' As an example they gave Honda's expertise in engines. Honda was able to exploit this core competency to develop a variety of quality products from lawn mowers and snow blowers to trucks and automobiles. On the other hand Galunic and Rodan (1998) argue that "a core competence differentiates not only between firms but also inside a firm it differentiates amongst several competencies such as Quantity Surveying. In other words, a core competency guides a firm recombining its competencies in response to demands from the environment.

Canon demonstrated competencies in precision mechanics, fine optics and micro electronics. In late 1950s, canon applied these competencies to other areas of products than cameras such as business machines. By 1964, Canon diversified its product lines to electro fax copier and electronic calculator. The main factors behind increase in the number of products, technologies and markets seem to be the rapid growth of information technology and electronics, technological transitions from analogue to digital technologies, technological fusion of audio and video technologies. Canon provides an example how a firm turns its specific competencies to a competitive advantage and how it inevitably influenced the pattern of diversification, mainly because of reflective practice. The same theory can be adopted in Quantity Surveying being a much more challenged, heavily fragmented and diversified practice, profession and an applied science.

A diagnostic instrument such as potential index battery will help detect the competency of professionals engaged in the reflective practice. Hence, a protocol of reflective practice, with a profile of competency, related to Quantity Surveying would be a moment of truth in time to come. It will not only enable staying abreast of changed circumstances but also will help refine identity amongst the clients and professionals in other disciplines.

15.16 Summary

This chapter considered some sensitive districts of contract practice that might prevent claims becoming contentious. Getting the contract right from the beginning is the surest way for a dispute free project delivery. It starts with the decision on procurement choice. A wrong choice on procurement method is analogous to a wrong bus that takes the entire crew to a wrong destination. Reflective practice nurtured with a culture for value engineering and post project review eventually enhances sensible contracting and delivery of a quality service whilst preventing professional image from being collapse, apart from what they traditionally offer. Mediatory measures are the best in many instances where a group of neutrals interpret commercial and contractual issues in line with the contract documents, principles of quantity surveying and accepted norms, customs and traditions of the construction industry. These neutrals form opinion as to contractual eligibility, validity and quantum of claims in terms of cost, time and otherwise, resulting in amicable settlement.

APPENDIX A
DISCOUNTING

Assessment of financial impact in application of discounted rates and Contractor's proposed new rates based on anticipated final quantities

Item No	Qty	Unit	Rate	Amount	Discounted Rate	Contract Amount	CT Rate	CT Amount
203.1	490000	m3	2.75	1,347,500.00	2.44	1,195,131.57	2.75	1,347,500.00
203.2	108000	m3	2.35	253,800.00	2.08	225,101.59	1.76	189,972.00
203.3	30000	m3	1.93	57,900.00	1.71	51,352.96	1.63	48,900.00
203.4	0	m3	2.45	0.00	2.17	0.00	2.12	0.00
206.1	1400	m3	2.67	3,738.00	2.37	3,315.33	2.41	3,374.00
206.3	200	m3	5.90	1,180.00	5.23	1,046.57	5.34	1,068.00
302.3	16000	m3	5.10	81,600.00	4.52	72,373.09	3.18	50,880.00
409.1	69	m3	17.30	1,193.70	15.34	1,058.72	16.06	1,108.14
410.1	138	m3	36.72	5,067.36	32.57	4,494.37	34.70	4,788.60
504.1	0	m3	27.46	0.00	24.35	0.00	23.94	0.00
504.2	150	m3	20.29	3,043.50	18.00	2,699.36	17.38	2,607.00
504.3	1400	m3	60.63	84,882.00	53.77	75,283.98	53.09	74,326.00
509.1	175	ton	190.33	33,307.75	168.81	29,541.48	167.75	29,356.25
804.2	9	No	2114.75	19,032.75	1875.62	16,880.62	1818.93	16,370.37
804.3	25	No	184.33	4,608.25	163.49	4,087.17	159.94	3,998.50
805.3	1900	m3	1.10	2,090.00	0.98	1,853.67	1.04	1,976.00
807.1a	4470	m	5.95	26,596.50	5.28	23,589.10	5.31	23,735.70
807.1b	22	m	8.60	189.20	7.63	167.81	7.60	167.20

807.1c	4470	m	13.23	59,138.10	11.73	52,451.07	11.69	52,254.30
807.1d	22	m	6.78	149.16	6.01	132.29	6.05	133.10
807.1e	22	m	9.75	214.50	8.65	190.25	8.56	188.32
807.1f	83	m	26.16	2,171.28	23.20	1,925.76	22.83	1,894.89
807.2	520	m3	6.51	3,385.20	5.77	3,002.42	5.83	3,031.60
808.1	400	m	115.15	46,060.00	102.13	40,851.77	97.82	39,128.00
901.2a	22900	m2	4.72	108,088.00	4.19	95,865.96	4.29	98,241.00
901.2b	24800	m2	4.72	117,056.00	4.19	103,819.90	4.29	106,392.00
901.2c	13200	m2	4.72	62,304.00	4.19	55,258.98	4.29	56,628.00
901.2d	200	m2	4.72	944.00	4.19	837.26	4.29	858.00
901.2e	3900	m2	4.72	18,408.00	4.19	16,326.52	4.29	16,731.00
1706			(Prov)	5,000.00		5,000.00		3,839.11
1900	0	m2	55.99	0.00	49.66	0.00	47.98	0.00
Total				2,348,647.25		2,083,639.57		2,179,447.08
				(a)		(b)		(c)

Key statistics

Sum named in the letter of intent	3,397,397.00
Discount offered at the award	83,595.00
% of discount	11.29
Amount applicable for discount (i.e., excluding provisional sums)	3,392,397.00
% of discount applicable for measured works	1.31

Net effect

Estimated contract discount (a-b)	265,007.68
Estimated Contractor proposed discount (a-c)	169,200.17
Estimated increase in contract price	95,807.51

Notes

CT stands for the Contractor

Contract value is ascertained on re-measurement basis.

Discounted rates are the rates after discount when proportionately applied.

Provisional sum is not subject to discount. It is Employer's allocation in the Contract.

APPENDIX B
VARIATIONS EXCEEDING 20%

Data at contract award

a	sum named in the letter of award		2,526,345.00
b	value of provisional sums		40,000.00
	fire extinguishers	15,000.00	
	landscaping work	25,000.00	
c	value of prime cost sums		12,000.00
d	value of fixed sums		8,000.00
e	contingency		229,667.73
f	day works		3,500.00
g	discount offered		550.00

Data at completion

h	value of measured work (in measured bills) after adjustment of quantity variances		2,210,550.00
i	value of varied work		655,245.00
j	measured value of provisional sums		25,434.00
	fire extinguisher	4,700.00	
	landscaping	20,734.00	
k	day works		4,565.00
l	prime cost sums		0.00
m	price escalation		35,000.00
	Total value of work done (price escalation excluded)		2,895,794.00

Analysis

Tendered sum excluding all provisional sums, a-(b to g), i.e. effective contract sum (A)	2,232,627.00
Value of measured works at completion excluding all provisional sums, day works and escalation payments (B)	2,865,795.00
% increase (B-A)/A x 100	28.36

Note

Values can be in any currency.

The Contractor is eligible for a rate revision or any other adjustment in order to recover his under-absorbed overheads due to varied works in excess of 8.36 over the effective contract price.

APPENDIX C
SCHEDULE OF CLAIMS

Notes:

1. The following table illustrates the grounds giving rise to claims, likely effect, actions to be taken, time for notification and the entitlement of a couple of instances which essentially follows a time and/or cost implication.

2. The clause references are not specific to a particular standard form of contract; instead they recline to traditional forms.

3. The burden of proving entitlement and the quantum of time and/or cost falls on the Contractor in all cases.

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
5.2	Ambiguity in contract documents unforeseeable by an experienced Contractor	Delay, disruption, cost increase	Notify Employer and Engineer. Take alternative actions to avoid or mitigate. Lodge the intent of claim	Forthwith	Cost on correction
6.3	Delay in issuing drawings/orders by Engineer	Delay, disruption, cost increase	Notify Engineer in writing State effects of time and cost	7 days	Idling time and cost if any
6.3	Issue of amended drawings and specs	Delay, disruption, cost increase	Notify Engineer in writing State effects of time and cost	7 days	Abortive cost and time
12.3	Unforeseen physical conditions and artificial obstructions (without prejudice to site inspection clause)	Delay, disruption, cost increase	Notify Engineer in writing of impact of claim (extension of time and extra cost)	forthwith	Cost plus profit and time

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
17	Setting out on incorrect data furnished by Engineer	Delay, disruption, cost increase	Notify Employer and Engineer in writing of intent and impact	7 days	Cost on abortive work, reinstatement, and time
18	Exploratory excavation /boreholes required by Engineer (if such item or provisional sum not included)	Delay, disruption, cost increase	Notify Employer and Engineer in writing of intent and impact of claim	Generally not stated	Cost plus profit and time
20.1	Making good damages due to excepted risks	Delay, disruption, cost increase	Notify Employer and Engineer in writing of intent and impact of claim	Forthwith	Cost plus profit and time
27	Disposal of fossils on Engineer's order	Delay, disruption, cost increase	Obtain order in writing and lodge claim	Immediately upon discovery	Cost plus profit and time
31	Services provided to other Contractors on Engineer's request	Delay, disruption, cost increase	Notify extra time and cost	Not stated	Cost plus attendance fee and time

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
36.4	Tests required which were not intended in the contract	Delay, disruption, cost increase	Keep records, ascertain results, lodge claim	Not stated	Cost plus profit
38.2	Uncovering of works and inspection to works which are already covered and found to be in accordance with the contract	Delay, disruption, cost increase	Keep records, obtain results, lodge claim	Not stated	Reinstatement cost and time
40.1	Suspension of works on safety grounds	Delay, disruption, cost incurred	Lodge claim for reimbursement	Within 28 days	Actual loss and time
40.2	Resumption of work following a suspension	Re-commission work, obsolete rates, extension of time	Write to Engineer after permission to proceed. If no response, give further notice that deemed to be abandonment	Within 28 days	Cost of resumption, lost profit

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
42.1	Employer fails to give possession of site	Delay and recurrent costs	Lodge claim for reimbursement	Not stated	Actual loss and time
43	Early completion on Employer's request	Acceleration	Lodge claim for reimbursement	Not stated	Additional cost or bonus
50	Rectification of defects which the Contractor is not liable	Cost incurred	Notify extra cost, lodge claim	Not stated	Cost plus profit
51	Variations under contract	Delay, disruption, cost incurred	Obtain written order for variation or confirm order in writing	7 days for confirmation	Cost plus profit and time, new rates
52.3	Variations exceeding 10%	Unabsorbed overhead	Submit calculations and claim separately	Not stated	Rate revision, Lump sum adjustment
60.4	Delay in certification by Engineer	Financial charges	Notify the Engineer	Not stated	Not entitled

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
60.9	Delay in payment by Employer within (60 days) after receipt of Engineer's certificate	Financial charges, delay in return	Notify the Engineer and claim 7% interest	Recommended as on date of delay	Interest only
66	Without default of either party a contractual obligation has become incapable of being performed (frustrated)	Damages	Give notice and lodge claim	Not stated	amounts not fully covered by payments made on account basis all works executed prior to the date of termination preliminaries in proportion to partial execution materials at site and those legally liable to accept delivery any expense reasonably incurred in the expectation of completing
66 (cont)					the works and for which the Employer shall have derived benefit which is not covered in previous payments

Clause	Grounds giving rise to claim	Likely effect	Actions to be taken	Time for notification	Entitlement
70.1	Increase in prices of materials and labour	Obsoleteness of rates	Notify the Engineer and lodge claim	Not stated	Additional cost on procurement
70.2	Changes in subsequent legislation	Delay, disruption, cost incurred	Notify the Engineer and lodge claim	Not stated	Additional cost and time if any

The following table illustrates the Employer's basis of claim, right and method of recovery.

Clause	**Basis of claim**	**Rights to recovery**	**Method of recovery**
17	Incorrect setting out and the Contractor failed to rectify at his own cost	Employer deployed another person to rectify	Recover as a debt
25.2	Contractor did not keep the insurance valid	Employer paid the premiums	Deduct the amount paid or recover it as a debt
30.3	Highways are damaged whilst transit of plant and machinery	Engineer certified an amount as due from Contractor on the failure to rectify damages	Deduct from value of work done
39.2	Contractor did not comply with Engineer's order to remove or substitute materials	Employer deployed another person to carry out instruction	Deduct the amount paid or recover it as a debt
47.1	Delay in completion	Penalty imposition	Deduct as stated in appendix to form of tender
49.4	Contractor fails to finish certain work which in the opinion of the Engineer, the Contractor is liable to do at no cost to contract	Employer deployed another person to carry out such works	Deduct the amount paid or recover it as a debt
52.3	Variations exceeding 10%	Restoration of overhead	Rate revision, lump sum adjustment
59.5	Contractor fails to show reasonable proof of payments to nominated sub Contractors	Employer pays them direct	Deduct by way of set off
63	Default by Contractor leading to expulsion from site	Employer deployed another person to carry out balance works	Proceeds of sale of plant, materials and temporary works, en-cash bonds, withhold retention
63	Contractor's slow rate of progress	Terminate after notifications	Valuation at date of forfeiture

Cause	Basis of claim	Rights to recovery	Method of recovery
64	Urgent remedial works for safety not attended by Contractor	Employer deployed another person to carry out such works	Deduct the amount paid or recover it as a debt
66	Without default of either party a contractual obligation has become incapable of being performed (frustrated)	Employer invokes frustration clause	Reconcile accounts by crediting with any outstanding balances due from the Contractor.
70.1	Reduction of material prices and labour costs	Reduction in basic costs reflected in application of a formula method	Adjust the contract value by a reciprocal claim

APPENDIX D
NOTICE REQUIREMENTS

Timely notice and response is fundamental to many clauses including typical claims clause as it otherwise essentially follows time and cost consequences. Rather than punitive, the idea is optimistic in that parties are taken to have proactive actions in order to avoid or mitigate such impacts. A schedule of notices at a variety of circumstances is given below.

Ref	Description of the Issue	Time frame	Comment
1	Engineer to confirm, reverse or vary Engineer rep's decision (in reference to notice of Contractor's dissatisfaction)	7 days	It wholly depends on the technicalities involved in the issue including how urgent the matter is pending direction on safety, quality, cost and time. Contractor will have to recall the Engineer in case 7 days lapse.
2	Employer's entitlement (to take action) on the Contractor's failure to comply with the Engineer's repeated instruction	7 days	Though the number of repetition is unknown. However, it would mean persistent negligence of the Contractor to adhere to Engineer's instructions, which is a breach of contract, paving way towards termination. There should be a point of time to start 7 days.
3	If the Engineer's instruction is not in the interest of the works or constitutes a variation, Contractor to notify the Engineer within	3 days	3 days seem viable in many cases. The Contractor is obliged to notify of any time and/or cost implications associated with such instruction, allowing an opportunity to revisit the same for amendments if any
4	Contractor to comply or implement the procedures after confirmation or amendment or withdrawal of Engineer's instruction	3 days	Basically the technicalities decide the importance of timely compliance, since repercussions follow, often with immediate effect.
5	Contractor to give a prior notice if the issue of further drawings and specs going to delay	7 days	This should not bar the Contractor's entitlement for any cost and/or time impact since timely supply of drawings is basically an obligation of the Engineer.

Ref	Description of the Issue	Time frame	Comment
6	Performance bond to submit before letter of award issued	10 days	10 days upon a notice is a reasonable period for arranging a performance bond and should be condition precedent prior to sign the contract and release advance money
7	Contractor to submit extended / enhanced bond from instruction to do so	14 days	14 days upon a notice should not be a time bar to lose any right to submit later, instead it can be a condition precedent to make payments
8	Contractor to submit detail programme from the letter of award within	14 days	This is generally a short period for a comprehensive program. It can have two tier submissions with a feasible deadline.
9	To supply the full details of site accidents within	2 days	It would have been better to forthwith notify any incident and give as much as possible all details from time to time.
10	Notice to seek permission to resume works after 90 days suspension	28 days	Implications associated with non compliance of this notice requirement are not clear to many. The expiry of 90 days is a turning point at which either omission of part of work or abandonment of whole of works takes place. Both parties have equal magnitude. 28 days is considerably lengthy.
11	Further notice to treat suspension as omitted (if part of works) or abandonment (if whole of works) on Engineer's silence	not given	Belated notices are not healthy at all.

Ref	Description of the Issue	Time frame	Comment
12	inform impossibility to proceed with works on excepted risks or any acts of the Employer	7 days	A move must be towards 7 days to zero days since impossibility may constitute a breach of contract on the level of exception in risks
13	Engineer to issue suspension order on above notice on excepted risks within	14 days	The Engineer may act otherwise prior to expiry of 14 days
14	Engineer to notify (irrespective of any EOT notice by Contractor) delay in completion	not stated	Notice on delay in completion is different from notice on slow progress. However both notices must be served without unreasonable delay. There should be no time bar for pro-actions, but in-time actions are better than on-time actions.
15	Engineer to notify any EOT	not given	A notice for time extension automatically cancels a delay notice. Stipulating a time frame for notices may create new contractual dimensions.
16	Contractor to notify any delay or default of the Engineer or Employer	7 days	As noted, this 7 days time frame is reasonable. However, it should not be a time bar for the Employer's benefit.
17	Notify unavoidable additional work due to events identified in clause 44	7 days	Clause 44 is time extension in traditional forms in which a couple of events excusing time extension can be specifically stated. 7 days is reasonable
18	Submit detail particulars after above notification within	28 days	28 days is a reasonable period of time in line with monthly interim application
19	Final particulars to submit after effects cease	28 days	This is a reasonable approach for catering prolonged effects

Ref	Description of the Issue	Time frame	Comment
20	Notice for urgent works in night, or holidays	immediately	This is again a reasonable approach for un-postponable urgent works
21	Contractor to request the Engineer to issue the Taking Over Certificate on completion	not given	Completion is a landmark and the Contractor must serve a notice as soon as possible.
22	Engineer to issue Taking Over Certificate after notice within	28 days	An adequate period must be given for the Engineer to undertake a search and measurement as to level of completion. Adequacy of period depends on technical complexity
23	Contractor's entitlement to receive the Taking Over Certificate on satisfactory completion	21 days	There should be a starting point to calculate the entitlement. Once the satisfactory completion has been declared by the Engineer, a period of 21 days is at high range since the Contractor is awaiting to undertake rectification of snags as per the snag lists attached
24	Contractor to rectify defects (maximum leverage after final inspection)	14 days	It is a good move whenever the Engineer needs to extend this leverage for defects not easily segragable to 'whose' accounts
25	Contractor to submit variation submission (both cost and time) after such instruction within	14 days	Time is not assessed in each and every individual variation order
26	Engineer to instruct either proceed or withdraw after variation submission	7 days	This is to obtain time and cost impact of a Contractor initiated proposal or Engineer's instruction prior to give the green light to proceed or red light to withdraw. 7 days is fair enough for an appraisal

Ref	Description of the Issue	Time frame	Comment
27	Engineer to ascertain time and cost after above notice in failing agreement within	28 days	This is in fact varying with the type of instruction. 28 days seem a considerable period
28	Engineer to issue advance payment certificate upon application after submitting advance bond and performance bond	14 days	7 days would have been ideal once the authenticity is established.
29	Engineer to certify monthly statement upon submission	28 days	This is relatively a reasonable time frame for measurement, valuation and certification
30	Any balance payments to be made or recovered after final certificate	42 days	42 days is again an ideal time frame since the final certificate constitutes finality in the amounts due under the contract.
31	Contractor to resume works after suspension	28 days	28 days can not be always the right answer since resumption may take more than 28 days depending on the work involved, particular when new resources to be mobilised a site.
33	Employer's failure to make payments after certificate (to be considered as a breach)	3 months	3 months is a buffer time within which the Contractor may have a remedy for late payment. At the expiry of three months, the Employer comes under contractual breach.
34	Contractor terminates his own employment after notice (on the Employer's breach)	14 days	This may not be compatible with rest of the provision in many cases.

It should be noted that deadlines given for notices to communicate intent, submissions, response or disagreement are worse case eventualities.

No party will lose its rights unless otherwise specifically mentioned that the non-compliance with the deadlines shall automatically lose one's right. Condition precedent must be clearly expressed, therefore.

APPENDIX E
PROLONGATION COSTS

No	B/Q Item	Amount 1	Original contract period	Eligible period	Amount 2	Amount 3	Comment
1	performance bond	210,000	365	57	32,795	14,500	(paid on actual additional premium)
2	Contractor's superintendence	2,700,000	365	57	421,644	250,878	
3	Contractor's employees	5,280,000	365	57	824,548	490,606	
4	setting out	180,000	365	57	28,110	0	fixed costs
5	watching and lighting	685,252	365	57	107,012	63,672	
6	health and safety	250,000	365	57	39,041	23,229	
7	insurance		365	57	0		
8	damage to persons and property	300,000	365	57	46,849	0	(no enhancement in insurance)
9	third party insurance	included	365	57	0		
10	accident to workmen	included	365	57	0		
11	opportunities for other Contractors	100,000	365	57	15,616	0	demobilised

No	B/Q Item	Amount 1	Original contract period	Eligible period	Amount 2	Amount 3	Comment
12	site to be kept clear of obstructions	5,000	365	57	781	465	
13	constructional plant, temporary works etc	3,300,000	365	57	515,342	306,629	
14	general use and maintenance	300,000	365	57	46,849	27,875	
15	Contractor's site office	50,000	365	57	7,808	302,561	only 65% for maintenance
16	Engineer's office	180,000	365	57	28,110	1,089,219	ditto
17	Engineer's facilities	300,000	365	57	46,849	27,875	
18	de-watering	25,000	365	57	3,904	0	method related
19	traffic diversions	250,000	365	57	39,041	23,229	
20	site clearance	60,000	365	57	9,370	5,575	
21	all other costs not included elsewhere	150,000	365	57	23,425	1,396,435	(not apportionable)
	Total of preliminaries bill	14,325,252				4,022,750	

Amount 1 - lump sum quoted in tender

Amount 2 – amount considered against compensable period, i.e (125 – 68) days

Amount 3 – amount contractually eligible after comments

Key data

Original contract period (days)	65
Time extension granted (days)	25
Concurrent impact period (days)	68
Original contract sum	165,000,000
Work done during the extended period (works valued against the bills of measured works including varied works)	78,550,312
Original value of the measured works in the priced bill of quantities	12,000,000
Approx % increase in value of work done progressed during the extended period	70%
Assumed profit allocated in preliminaries	15%

Notes

1. It is assumed that the extent of site overheads depends on the quantum of work during the extended period in proportion to the same in original contract period.
2. Profit is included in the calculations of individual varied work and any profit margin in the lump sums quoted for preliminaries was taken aside in the search of replacement cost.
3. Amount contractually eligible shall also exclude any fixed cost components.
4. Equally the method-related charges are excluded.
5. Performance bond was enhanced and recovered on actual invoice for the premium paid, which is 14,500.
6. No insurance has been extended on enhanced values since they are still valid.
7. Maintenance component is taken as 65% of the lump sum quoted.
8. Values could be in any currency.

Limitations

1. Rates quoted for preliminary items could be time, method or activity related or even in doubt as to what category a particular preliminary item would belong to.
2. They are forecasted values quoted in competition. They are values that the Contractor thought might happen rather than actually happened.
3. They may have subjected to any pricing strategies such as front end loading, back end loading, or that gives maximum return during the largest gap in cash flow.
4. Rates quoted for preliminary items, similar to other unit rates, contain a profit element. Actual costs should exclude profit. A party should not profit from another's loss out of eventualities beyond control of either party.
5. The philosophy behind the compensation is to bring back the Contractor into the original position where he stood financially had there been no delay.
6. The impact due to prolongation may also depend on site involvement. For instance, the actual costs on preliminaries at the beginning and end of the progress along with the S-curve may be not as big as in the peak. The amount of additional burden taken over by the Contractor varies with the period as-impacted.
7. A contract may well be having many hundreds of variations, and many dozens of these could be critical and contributing to the delay. Pro-rated preliminaries may duplicate the amounts for variations individually priced under variation clause/s.
8. Concurrent delays are excusable but not compensable, as a principle.
9. In contracts of civil engineering nature, payments on time related basis would be wholly inapplicable when such a contract is prolonged.
10. Time extension due to suspension of whole of the works or delay in site possession (that pushes ahead the planned program as a bunch) may not necessarily cost the

preliminaries in full. It may sometimes cost more than what is catered for in the preliminaries.

11. As there is usually a short ad-hoc preliminaries bill, the use of preliminaries in calculating prolongation is not complete in a sense. Some items are neither measurable nor priceable.
12. Tender price break up is usually subservient to the contract once obtained after the contract has been let and any particular inclusion or exclusion does not bind the parties in a prolongation issue.
13. The intricacy of the issues when they are inextricably intertwined has made more difficult in using preliminaries as the basis of prolongation costs.
14. Preliminaries are basically site overheads not to be duplicated with other recoveries in varied works, variations exceeding 20% or in unabsorbed head office overheads.
15. This method of calculating extended preliminaries must be the last resort since it does not result in a reliance cost. Overheads are more sidelined in proportion to the work load instead of the time factor.

APPENDIX F

PRICE FLUCTUATION

A universal formula for Price Adjustment is;

$$Pn = A + b\,\frac{Ln}{Lo} + c\,\frac{Mn}{Mo} + d\,\frac{En}{Eo} + \ldots\ldots\ldots$$

where,

“Pn” is the Price Adjustment factor for the work carried out in the period “n”

“A” is a constant or the non-adjustable portion of the Price Adjustment Factor to be specified in the Contract Price.

“b, c, d.........” are coefficients or weightages for each specified element of adjustment in the Contract.

“Lo, Mo, Eo........” are the base indices for the specified (adjustable) elements.

“Ln, Mn, En.......” are the current indices of the specified (adjustable) elements for the period “n”.

Notes

1. The prices at the base date and effective date shall be obtained from the sources specified in the contract.
2. Only specified elements are subject to price adjustment.
3. The coefficients for each specified element shall be calculated and given in the tender documents as determined in proportionate to its ratio among all the adjustable elements.
4. The sum of these coefficients shall form the adjustable portion of the contract.

5. Source of base prices and current prices may also be stipulated in the contract.
6. The executed quantities of the elements subject to price adjustment can be obtained from the actual measurement or from certified invoices or any other mode as agreed between the parties.

There are many other formula methods to calculate the escalated component of the prices of building materials, labour and plant. Many of them, if not all, use input proportions and price indices. Let us assume in a basic derivation the input proportions are as follows;

Cement	ct%	Electrical items	el%
Steel	st%	Plumbing items	pb%
Timber	tm%	Skilled labour	skl%
Blocks	bl%	Unskilled labour	unskl%
Metal	mt%	Plant	pl%
Lime	lm%	Rest	rs% which is 100- (ct% to unsk%) while cost adjustment factor is fca

The Contractor submits a bill for	$ V
Non adjustable items are	Vna
Hence the cost of work which needs to be adjusted	Vca = (V-Vna)/fca
The cost of cement	ct/100 x Vca
Base index for cement	Ib
Current index for cement	Ic
Reimbursement of cement in the current claim	ct/100 x Vca x (Ib-Ic)/Ib

The total reimbursement to the Contractor can be computed using;

100/(100-re) x [ct/100 x Vca x (Ib - Ic)/Ib] (subject to any further adjustment on tax, profit, wastage etc)

Notes

1. Input proportions are the percentage share by the construction inputs such as materials, labour and plant in the total cost of the project

2. Only the major cost significant items are generally considered for price escalation
3. A list of specified materials could be given in the Conditions of Particular Application.
4. These inputs proportions can be calculated using building schedule of rates, standard norms and work studies, which is usually a pre-tender function of the Quantity Surveyor.
5. Basic prices are generally those established 28 days prior to the date of closing of tenders.
6. Current prices are those prevailing and/or applicable at the time the Contractor procure on a pre-plan agreed between the parties.
7. Adjustments to the contract price may be either an addition or deduction.
8. No account shall be taken on profits, off site and general overheads.
9. Prices could be ex-factory, imported, or open market.
10. Generally, the prominence is given to state sector sources for the basic prices of some selected inputs such a fuel, cement, steel etc.
11. Reimbursement can also be reconciled for wastage.
12. Prices of materials can be excluded off the costs on delivery to site.
13. Cost adjustment factor is the adjustable component of the contract price.

In contracts assigned on lump sum basis without detailed breakdown of quantities and cost, cost adjustment for the specified elements in the contract may be computed on simple derivation, increase/decrease in cost = Current Price - Base Price, multiplied with quantities verified as procured and/or consumed (only when in unprecedented price escalations in the open market, compensable on special approval on ex-gratia basis).

APPENDIX G
ACCELERATION COST

It was a road project where the completion of works showed behind schedule due to a couple of changes in the fixing of steel reinforcement in several underpasses caused by delays in the issue of drawings and bar bending schedules for which the Employer is liable. Unless the cages of reinforcement have been aligned in place at the deadlines as planned, there will be a domino effect on many other subsequent tasks including pre-mix concrete pouring.

Accordingly, if the amount of work in relation to formwork can be doubled, reinforcement fixing can be increased when drawings are ready in hand. However, it was not allowed in the specifications and thus decided to divert two gangs of carpenters into the works at central median so that there is no question of idling. Later when the reinforcement schedules were ready at site, there were many changes in the resource allocations and temporary site arrangements so as to catch up the delays involved in the fixing of reinforcement as well as formwork suspended for a certain period. These changes included mobilization of two more mobile cranes on site in order to ease out any bottleneck in steel fixing. A new gang of carpenters and steel fixers were also required to expedite the process to be in line with the scheduled tasks in time to come.

The Contractor maintained records with prior notice and submitted his claim in the title of acceleration. It was 6 days a week.

No	Resource	No	Weeks	Hours per week	Rate	Amount
1	charge hand	3	6	72	18	23,328
2	Carpenters	15	6	72	15	97,200
3	semi-skilled labourer	6	6	72	12	31,104
4	steel fixers	24	8	72	18	248,832
5	semi-skilled labourer	10	8	72	12	69,120
	Overtime					
1	charge hand	3	6	18	24	7,776
2	Carpenters	15	6	18	18	29,160
3	steel fixers	24	8	18	22	76,032
4	semi-skilled labourer	8	8	18	15	17,280
1	mobile crane	2	4	72	200	115,200
2	additional inputs in traffic diversions					3,250
3	increment in material costs					0
	Total cost on acceleration					694,954
	Overhead and profit as agreed					15%
	Total claimed amount					**799,197**

APPENDIX H
UNABSORBED OVERHEAD RECOVERY

Budgeted head office overhead for the current financial year of the company

No	Item	Qty	Unit	Rate	Amount
1	office rent	12	months	1,000	12,000
2	telephone bills	12	months	450	5,400
3	electricity bills	12	months	500	6,000
4	Water	12	months	120	1,440
5	computer costs	12	months	2,000	24,000
6	maintenance of office equipment	12	months	500	6,000
7	clerical work	12	months	3,000	36,000
8	vehicles with lease payments	12	months	6,500	78,000
9	vehicle maintenance	12	months	3,000	36,000
10	stationary	12	months	500	6,000
11	Training		item		1,500
12	research and development		item		5,000
13	Entertainment	12	months	100	1,200
14	Salaries	12	months	90,000	1,080,000
15	other incidental costs	12	months	650	7,800
	Total estimated overhead cost per year				**1,306,340**
	Estimated annual turnover from construction projects				15,450,000
	Head office overhead contribution from turnover				8

Compensable delay	21
Contract sum	4,500,000
Time for completion (days)	365
Assumed shortfall in turnover (contract sum/contract period) x delayed period	258,904
Short fall towards head office overhead (shortfall in turnover x overhead contribution)	**21,891**

Formula methods of computing unabsorbed head office overhead

1. Hudson formula

$$\text{Planned HOOH\%} \quad \text{X} \quad \frac{\text{Original contract sum}}{\text{Original CP}} \quad \text{X period of Employer-caused delay}$$

CP stands for contract period. This formula gives the allocable overhead monetary amount per unit of time. The underlying hypothesis are that the planned overhead (as considered in the bid) was reasonable, the overhead was capable of being earned elsewhere just in time of the delay occurred and that the work of the same level of overhead recovery was available during the period of delay. Also, it assumes that the bid rate remains constant for ever till completion, irrespective of work load at the corporate level and there is an assumption that the Contractor is working at full capacity in the time frame under consideration.

However, the source of overhead percentage is not clear if it was not specifically mentioned or quoted in the contract or agreed between the parties. In applying overhead and profit percentage to the weekly amount of contract sum the percentage is being applied to a figure which itself includes an element of overhead and profit. The formula needs correcting to reduce the contract sum to a figure net of overhead.

2. Emden Formula

$$\frac{\text{Total company OH + Profit during CP}}{\text{Total company revenue for CP}} = h$$

$$h \quad \text{X} \quad \frac{\text{Gross contract sum}}{\text{Planned CP}} \quad \text{X} \quad \text{Employer caused delay period}$$

This formula is a variation to Hudson formula, created by Canadian Courts. It substitutes the bid overhead percentage with an actual number.

It takes the total actual overhead and profit as a percentage of the Contractor's total actual sales and applies it to the original contract period to give an allocable rate per unit of time. Profit has been added on the thinking that the Contractors after making their commercially viable and competitively sound estimate of the prime cost of the whole project add a reasonable profit component as a percentage thereafter. This relates the damages back to the original bid while at the same time using an actual overhead percentage.

Emden formula presumes that the overhead allocation to the delayed period is primarily based on the Contractor's performance in the past, and is why it requires a backward looking accounting approach to decide on the revenue. This forensic element is inherent in many other formulas.

The calculation of the percentage as the first stage requires accounting records for at least in several financial years. It attempts to allocate total company overhead to a project on first a proportionate basis and then a daily basis and utilizes both overhead and profit costs as a part of the calculation and then multiplies the result times the amount of owner-caused delay incurred.

3. Eichleay formula

$$\frac{\text{Contract billings}}{\text{Total billings for actual CP}} \text{ X Total overhead during the actual CP} = \text{Allocable OH}$$

$$\frac{\text{Allocable OH}}{\text{Actual days of contract performance}} = \text{OH allocable to contract per day}$$

Daily OH x Days of Employer caused delay = HOOH owed

This is a time based formula that calculates a daily overhead rate based upon the actual contract period including the delay. This formula attempts to allocate HOOH for the entire contract period first to the project and then recalculate it on a daily basis to determine the compensation owed.

Eichhleay formula is based upon actual numbers including the delay period and is concerned with unabsorbed overhead in the past where as Hudson and Emden formulas are concerned with the lost opportunity in the future to recover overhead.

A linear relationship exists between contract billings and fixed indirect costs. However, contract billings may sometimes contain overhead and profit.

The costs incurred during the contract period were assumed to be nominal. No variable costs are and should be included as fixed costs under the tile of overhead. How to detect any variable is a matter of accounting.

The time gap of the delay does not cause any change in the amount of unabsorbed overhead. The effect is negligible when the project is nearing completion. It is assumed that the Contractor had work to be undertaken during the delayed period, but for the delay, he missed and otherwise was working at full capacity during the period of performance.

Eichleay formula does not include profit but it assumes a uniform rate of spend and relates to actual expenditure on overhead to all activities and then the expenditure to time.

4. Modified Eichleay 1 formula

$$\frac{\text{Contract billings}}{\text{Total billings for original CP}} \text{ X Total overhead during the original CP = Allocable OH}$$

$$\frac{\text{Allocable OH}}{\text{Original days of contract performance}} = \text{OH allocable to contract per day}$$

Daily OH x Days of Employer caused delay = HOOH owed

This formula attempts to allocate HOOH for the original contract period first to the project and then recalculate it on a daily basis to determine the compensation owed. It assumes that the HOOH rate from the original contract period should hold the same even during the delayed period.

This modification is based on the assumption that the compensation must be based solely upon the original contract period and therefore the original contract period excluding the delay has been substituted for the actual contract period including the delay.

5. Modified Eichleay 2 formula

$$\frac{\text{Contract billings}}{\text{Total Billings for original CP + contract billings for extended period}} \text{ X Total overhead during the original CP} = \text{Allocable OH}$$

$$\frac{\text{Allocable OH}}{\text{Original days of contract performance}} = \text{OH allocable to contract per day}$$

Daily OH x Days of Employer caused delay = HOOH owed

It adds the value of contract billings during the extended period in an attempt to compensate for overhead costs spread over a longer period of time. This variation increases the denominator by the contract billings for the extended or the delay period.

The daily rate methodology taken up in Eichleay formulas abandons activity-based measures and expresses overhead in terms of a daily rate, which is a project-wide period of performance average.

6. Hank Lann formula

$$\frac{\text{Contract billings}}{\text{Total company billings}} \text{ X Total HOOH during the period of delay} = \text{Allocable HOOH}$$

This is a direct apportionment without reaching the intermediate stage of allocable head office overhead.

7. Ernstrom formula

$$\frac{\text{Total overhead for contract period for all projects}}{\text{Total labor costs for contract period of all projects}} \text{ X General overhead/ Overhead ratio}$$

Labour/overhead ratio X labour costs during delay = HOOH allocable

This formula rests on the theory that there is a direct relationship between overhead costs and labour costs that can be calculated and applied to a delay situation. That is, as labour costs grow so do the corresponding home office costs. Thus, by calculating this ratio and applying it to the amount of labour expenses incurred during a delay period, then the amount of damages due to the delay can also be calculated. Since this is a ratio formula, it does not develop a daily HOOH cost but rather calculates a lump sum cost.

8. Manshul formula

$$\text{Cost of work executed during delay period X } \frac{\text{Contract Cost \%}}{\text{Cost + Mark up\%}} = \text{Direct cost}$$

Direct cost X HOOH% = HOOH owed

This is more or less an accounting approach to recover overhead as a percentage of direct labour, which is common in the manufacturing sectors. This formula is a direct cost allocation method. It does not arrive at a daily overhead rate. Rather, it uses the as bid HOOH rate times the cost of work performed during the delay period to determine the overhead used.

9. Carteret formula

Actual OH rate during delay period - Normal OH rate = Excess OH rate

Excess OH rate X Total cost of working during delay period = HOOH owed

Carteret formula assumes that there is a differential in overhead rates during a delay period and calculates this difference. The formula then multiplies this rate differential times the cost of work performed during the delay period. Since this is a cost based formula, like Manshul, it does not derive a daily rate. The problem with this approach is that if no rate differential can be shown, then no HOOH is owed.

10. Allegheny formula

Actual OH rate during delay period - Actual OH rate during total duration = Excess OH rate

Excess OH rate X Contract base cost = HOOH owed

This is again cost based, and not time based. Thus, it does not derive a daily overhead rate but calculates overhead from the rate differential times the base bid cost. Again, if no rate differential can be demonstrated, then no HOOH is owed even if owner-caused delay is present.

Contract details	
Total firm revenue in the original period	132,857,674
Total firm revenue in the actual period	200,256,272
Total labour cost in actual period	62,500,275
original contract value	32,725,000
total contract value before the claim	40,770,275
billings in the original period	34,206,184
billings in the actual period	44,375,000
billings in the delay period	10,168,817
labour costs in the delay period	1,729,314
company overhead in the original period	6,229,000
company overhead in the actual period	11,228,684
total overhead and profit in the actual period	14,340,001
planned contract period in days	365
actual duration in days	510
extended duration in days	145
Employer caused delay in days	125
planned overhead and profit at the tender	7
normal head office overhead	4.5
actual head office overhead	5.5
actual head office overhead % by the delay period	6

Formula type	Result
Hudson	784,503
Emden	802,527
Eichleay	609,847
modified Eichleay 1	654,625
modified Eichleay 2	661,847
Hank Lann	275,312
Ernstrom	310,685
Manshul	427,661
Carteret	152,532
Allegheny	163,625

Arguments

1. When a project's cash flow is substantially diminished due to an Employer-caused delay, the Contractor's fixed HOOH costs are not absorbed by the project and must, therefore, be absorbed by other projects.
2. If the Contractor managed to secure new work, should he be allowed to recover head office overhead?
3. The delay is such that the Contractor can neither reduce head office overhead nor take on new work to absorb these costs.
4. There may be only under-absorbed overheads rather than fully unabsorbed overheads in a contract prolongation.
5. Even if a series of Employer-caused delays results in a contract prolongation, the Contractor can still recover his overheads because at no time had work been exhausted.
6. As long as some work is continuing under the contract, it is difficult, if not impossible; to accurately measure any under absorption of overheads and the damages become too remote and speculative.
7. The delay period for the computation of HOOH is not necessarily the period of extension but the period when the project's cash flow has been substantially diminished.
8. The period of extension is the period of time beyond the original contract date due solely to Employer-caused delays so that the total delay period must be sieved for the compensable component.
9. The Contractor is eligible only for the extended period and not the period of Employer caused delay whenever the latter is greater than the former.
10. Overheads have been recovered elsewhere in assessing varied work.
11. HOOH formula methods never result in actual loss, instead an approximation.

Limitations

1. HOOH is generally described as company costs incurred by the Contractor for the benefit of all projects in progress. These costs cannot therefore be directly allocated to a project and the Contractors are reasonably free to account for such costs in whatever manner they choose.
2. As a result, no one can reasonably presume that the Contractors spread or allocate their overhead and profit costs evenly across all pay items in the schedule of values.
3. Often the values fed into these formulas are not on authenticated records.
4. HOOH costs in strict accounting principles may also include bad debts, donations, entertainment costs, fines, interests and finance costs, losses on other contracts, advertising and costs on litigation and arbitrations etc. Some Courts and arbitral tribunals have disallowed to consider these cost elements for the purpose of compensating unabsorbed overheads.

Established general rules

1. Employer-caused delay must be proven.
2. Employer-caused delay must result in a substantial reduction in project cash flow.
3. The Contractor must show they were unable to take on new work due to the unknown duration of the delay and were unable to perform other work on this project to support HOOH costs.
4. The Contractor must show the Employer required them to remain on standby, ready to resume work quickly once the problem was resolved.
5. The Contractor must show that the project delay did not result from directed changes.

Overview

Eichleay variations operate on cost recovery principles based on historical data. Emden and Hudson formulas are based on the concept of lost opportunity. All the other formulas are related to direct allocation of resources.

There are limitations and hypotheses underlying the use of these formulas. Every formula assumes in existence of a favourable market where an adequate overhead and profit would have earned had there been no delay on the part of the Employer. Another general assumption is that the resources have been fully exhausted at the time of delay so that the Contractor would have diverted them otherwise into other new projects which were available had there been no delay on the part of the Employer.

Courts recognise that a contract who is delayed in completing a contract due to default of the Employer may properly have a claim for unabsorbed head office overheads, not necessarily during the period of delay, but just in time of the project extension, on the basis that the work force but for the delay, might have had the opportunity of being gainfully employed during the overrun period.

The burden of proof lies on the Contractor. It can be difficult to prove that an actual loss was sustained by nature that head office overheads are fixed in short run and varying in long run and are not directly related to specific contracts. Not only the actual loss, but whose loss fell on whom, when and how it were technically mitigated are also a burden of proof lies on the Contractor. The quantum comes next and the selection of appropriate formula is a matter of fact rather than a matter of policy, depending on the facts in issue. Limitations and hypothesis dictate this choice, the outcome of which considerably differs even with the same fact setting.

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